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AMERICAN VETERINARY REVIEW

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AMERICAN VETERINARY REVIEW.

JUNE, 1905.

EDITORIAL.

EUROPEAN CHRONICLES.

PARIS, FRANCE, April 20, 1905.

THE TICK THEORY HANDLED BY AN ACARIOLOGIST.—My knowledge of the great science of biology is limited, and, in fact, it is not in my competency to judge of any question where biological conditions are called upon to decide important problems. On account of my deficiency I have been willing to accept theories which after all might find afterwards their adversaries, and then I was obliged to change my opinion also. I suppose I am not the only one who in that position has been obliged to modify his ideas. I have just fallen again into one of those peculiar situations, but this time I will not come to any decision until I get more light on the subject.

We all know in America the amount of work that Texas fever has given rise to, and all of us, even if not specialists, have followed the many controversies which have taken place and the various opinions which were advanced. Among all the different expressions of opinion as to the principal means of contagion, there is one which has prevailed ever since the first appearance of the disease—that was the tick theory. It held fast, ridiculed by many, or again half and half fairly admitted by others; at last Dr. Curtice, of the Bureau of Animal Industry, gave the last blow to all the varieties of pro and con, and by his

observations and his researches, by his biological studies and his experiments, proved that the tick theory was the correct one; that it was by the ticks that the disease was transmitted; that where there was no tick there was no disease, etc., etc.

Of course, it was great sensational news; Curtice's work was taken hold of by others, and such authorities as Theobald Smith, F. L. Kilborne, and E. C. Schroeder, of the Bureau of Animal Industry, made known their conclusions in a report of 1893, viz.: . . . . . "(5) Texas fever in nature is transmitted from cattle which come from the permanently infected territory to cattle outside of this territory by the cattle tick (*Boöphilus bovis*). (6) The infection is carried by the progeny of the ticks which matured on infected cattle, and is inoculated by them directly into the blood of susceptible cattle. . . . . "

In transmitting his report to the Secretary of Agriculture, Dr. Salmon said: "Another significant discovery, not less marvellous, is that the microörganism which constitutes the contagion of the disease is transmitted through the egg to the young tick, and it is this, and not the adult tick carried by the Southern cattle, which finds its way upon susceptible animals and causes the disease. . . . ."

* * *

Advanced and supported by such authorities as those from the scientific staff of the Bureau of Animal Industry, the tick theory was soon endorsed by European investigators and other diseases were soon found and classified with Texas fever, as far as the original means of transmission—the ticks and their varieties. Nocard was perhaps among some of the first to proclaim and to endorse the discovery of the American scientists.

One man, however, was rebellious to the idea. Thorough biologist, close observer, and well acquainted with ticks and their mischiefs, Pierre Megnin, retired army veterinarian and member of the Academy of Medicine, will not admit the tick theory, and in Number 6 of the *Journal de l'Anatomie et de la Physiologie* has presented his arguments against it:

"It has not been sufficient," he says, "to incriminate the

flies which can prick and are blood-suckers, but other wingless insects have been accused of acting the same part of transmitting diseases from one animal to another." "These insects (the ticks) are great blood-suckers, it is true, but having no wings and being entirely unable to move from one animal to another, as flies or even some fleas do, how can they transmit a disease, although their belly is full of its germs, when they cannot pass from one to another animal?"

For Megnin the theory presented is all fancy and he rather severely says could be admitted by learned people, even accomplished bacteriologists, but not at all by acariologists.

In this article Mr. P. M. enters into a long and very scientific biological history of all ticks, in which I do not wish to follow him. I read these parts that, however, are interesting to the question: "To resume, fecundated females only attach themselves on animals to make a large provision of blood necessary for their very large progeny. It is impossible for them to pass upon two animals in succession. Males are perfectly harmless. Nymphæ are sometimes found on dogs, but in a stage of freedom which excludes all relation with the females. Larvæ are never seen on dogs or other large animals whose skin their weak buccal weapon could not pierce. . . . If it has been supposed that there were, it is because they were mistaken for young females unfed, which are 60 times smaller in size than females gorged with blood."

The conclusions of the author are: "At any rate it is forbidden to the tick to pass from one animal to another. When it is fixed on an animal it is for a given number of days (15), and when it drops it is to lay its thousands of eggs and die. The larvæ which come out of the eggs require months to complete their organization and when they become hungry they go on small mammalia with thin skins that they can pierce, and never on large animals as their mothers do. If larvæ have been placed on the skin of healthy animals, they have not transmitted the disease themselves as they could not pierce the skin, but it is probable that in the glass tube where they were born, there

remained still the cadaver of their mother, which contained spores of pyrosomes or piroplasmoses."

I wonder how a profane not posted on biology can answer Mr. P. Megnin. I leave my friends of the Bureau to do it.

* * *

THE EFFECT OF PILOCARPINE IN RABIES.—As long as I am on the subject of that interesting branch of science, biology, I may be allowed to record a little of what I have gathered at some of the meetings of the Society of Biology here, which may interest some of our readers, and in fact all veterinarians, as the subject is rabies. The remarks came from Prof. Remlinger.

The first communication was on the use of pilocarpine in the treatment of rabies and of other infectious diseases. The experiments which were related had for object to find out if excessive sudation and supersecretion of saliva, due to the administration of pilocarpine, would have some effect on the course of infectious diseases, and especially in rabies, whose virus is thrown off by the saliva. Experiments were made on rabbits and guinea-pigs inoculated with fixed virus, and upon two children suffering with rabies while submitted to the antirabic treatment. The result was entirely negative. The absolute inefficacity of the drug was proved. It also failed in reducing the infection of chicken cholera.

There was, however, some results obtained by these experiments, viz., it was found that the saliva obtained from rabid animals, after they had received an injection of pilocarpine, was not virulent. Other experiments were made on rabbits, dogs, and sheep which had been infected with fixed virus. An abundant salivation was promoted by a subcutaneous injection of pilocarpine, and the saliva, gathered as aseptically as possible, was inoculated in the muscles of 26 guinea-pigs and 37 rabbits. Some of these, 10 of each class, died from premature death two or three days after the inoculation, but 43 animals survived and were kept under observation for three and four months. None became rabid. The absence of virulency in the saliva existed whether the salivation had been produced at the beginning or

at the end of the disease. It was also present no matter what the dose of pilocarpine injected and the time the saliva was gathered—beginning, middle, or end of the salivation.

* * *

TRAVELLING VETERINARY SCHOLARSHIPS.—In my chronicle of July, 1903, I made allusion to a new departure originated in England by the Royal College of Veterinary Surgeons creating travelling studentships, offered to recent graduates desirous of attending one continental school, Alfort or Berlin, so as to take a post-graduate course. At that time I said, repeating Prof. Crookshank's words: "Travelling scholarships would be of quite as much advantage to veterinary as to medical students," and I concluded: "Why could not such prize be offered by our colleges instead of the free scholarship at home?" and again: "Why could not some generous benefactor be found to defray at least part of the expense?"

To-day I learn that not only England has followed Prof. Crookshank's suggestion and sent a student to Alfort, but that the Italian Veterinary Association offers for competition between the graduates of 1903 and 1904 the sum of one thousand francs to be given for the successful competitor under the condition that he will stay five months at either the veterinary school of Alfort or of Berlin, and attend the lectures on bovine pathology, contagious diseases and laboratory work attached to it, zoötechny, bacteriology and clinics.

I wonder if the A. V. M. Association could be induced to follow the step inaugurated by England and Italy.

* * *

ABLATION OF THE FETLOCK HYGROMA.—In most of the works on operative surgery, the tendinous windgall of the anterior face of the fetlock, also known as hygroma of that region, occupies but little space and the treatment which is recommended against it seems to be confined to comparatively simple methods. Cold applications and compresses for the recent and small tumors, or for more serious cases actual cauterization, puncture with trocar, seton, free incision, and finally the more successful and also

more severe resource of the injection of iodine. And yet with that arsenal there are cases where the prospect of success is very doubtful. It is evident that with the advantages that are offered by antisepsy, more radical means might be resorted to and more satisfactory results obtained. Such, indeed, were the facts in the records of two cases which I have found in the *Revue Générale.*

The first relates to an animal that had on the fetlock of one hind-leg, a soft fluctuating tumor, divided by the tendon of the anterior extensor of the phalanges in two unequal lobes, the external being as big as a hen's egg and the internal as a large pear. Operating as aseptically as possible, a flap of skin was removed, the synovial sac was freely opened and emptied of its contents. The borders of the incision were excised, about one centimetre on each side, and the wound closed by sutures and protected by an iodoformed collodion and wadding dressing. No suppuration occurred, cicatrization was perfect in a few days and the size of the fetlock reduced to four centimetres in diameter. It was a successful case of resection.

The second case, however, is yet more interesting. It is one of complete ablation of a large dropsical synovial sac of the fetlock of the left hind-leg, which formed a tumor measuring 17 centimetres in length and 8 in width. The operation was performed with all antiseptic measures. Incision of the skin, opening of the synovial sac with a long incision, escape of a reddish thick synovia, disinfection of the sac, excision of the side pieces of the membrane on each border, sutures of the serous coat and then that of the skin. The operation was performed under a fine stream of tepid solution. Semi-plastic dressing covered the whole region. Two months later the animal returned to work with the hygroma entirely removed.

While this affection seldom unfits a horse for work, there are many cases where such treatment as resection or even ablation of the sac is perfectly justified—even with the danger that may present the close connection with the articular synovial membrane of the fetlock joint.

ADRENALINE.—Our friends know well all that has been written about adrenaline, therefore it is not necessary to say more about it, and yet in the *Berliner Thierärztliche Wochenschrift* I find such a concise *résumé*, not only of all the properties of adrenaline, but also of the conclusions derived from experiments by Dr. Zehl, who tested them in hæmoglobinuria, in paraplegia, in diseases of the eye, in the diagnosis of lameness, in laminitis, etc., that I must present them here.

The conclusions of Dr. Zehl are as follows:

"Adrenaline is a powerful anæsthetic and a strong hæmostatic.

"The anæsthetic properties are manifested rapidly and last from 4 to 6 hours without toxic effects.

"The best way to administer it, in our domestic animals, is by hypodermic injections. The dose is 20 to 30 c.c. of a solution at 1-100° for cattle and 15 to 30 c.c. for horses. This dose can be repeated during the day.

"For diagnosis, it can be used at the dose of 5 to 7 c.c.—5 on each side of the lame leg.

"Adrenaline is a specific against hæmoglobinuria of bovines.

"It gives good effects in paraplegia of horses. It is efficacious in the treatment of external and internal inflammations of the eye.

"It is to be preferred to cocaine in the diagnosis of lameness.

"It may be useful in the treatment of laminitis.

"On account of its anæsthetic and hæmostatic properties, its use is imposed in all operations of minor surgery."

* * *

EIGHTH INTERNATIONAL VETERINARY CONGRESS.—The Executive Committee of the Congress, which will take place at Budapest next September, has recently held a meeting under the presidency of Dr. F. Hutyra, rector of the Superior School of Veterinary Medicine, in which important resolutions were taken.

After the report of Prof. Dr. Stefan de Ratz, the General Secretary, it was decided that the opening session would take place on Sunday, September 3. The sessions of sanitary police will take place the 4th, 6th and 8th. The other meetings of biology, pathology and the special section of tropical diseases shall be held on the 5th and 7th. The last session shall be held on September 9th.

Everything relating to the arrangements and distractions for the members have been prepared by a special committee, and nothing will be spared to add to the comforts of those who will be present. A special committee has been appointed to make preparations for the comfort and pleasure of the ladies who will accompany the members. A large attendance is expected, as the reports of the various foreign committees announce it. The conference which is to be held on tropical diseases is bound to be a great success. It will call special representatives from England and from the English colonies.

On the petition of the Committee of Management, His Royal and Imperial Highness the Archduke Joseph Augustus has graciously accepted the Patronage of the VIII International Congress of Veterinary Medicine. His Highness has also announced that he will assist willingly at the opening ceremonial, and that he will open in person the work of the Congress. On the evening of the first day the Archduke will hold a reception at the Royal Palace for the representatives of Foreign Governments and the Bureau of the Congress.

* * *

GOTTHEIL'S HISTOLOGY.—My bibliographical notice this month must be very short. I do not know if new books are not published or if they do not reach my office, but of late I have on my desk only one. I am afraid it is one of the kind that my friend Prof. Williams calls a reprint, and yet, no; it is not a reprint, as there is an addition to the text of the first edition, which, short as it is, may be sufficient to justify the "second edition, revised" of the title page.

The book is the "Manual of General Histology" that Prof.

W. S. Gottheil, M. D., wrote when he was teaching at the American Veterinary College. There is little to add to what was said of it when the work was published. It is a concise treatise, well fitted for the students.

In this second edition a few lines tell us in the preface of the addition of the few pages which are found at the end of the book and which tell the student of the readiest methods of examining tissues under the microscope. The book is sold by the same old house of Jenkins, of New York. A. L.

THE VETERINARIAN, STOCKMAN AND PHYSICIAN.

In recent numbers of the REVIEW have appeared several editorials urging veterinarians to identify themselves more actively with agricultural organizations. There is a growing tendency in this direction and it should be encouraged. Those editorials deserve to be reread and thought over, as the realization of their object (closer relations with agricultural organizations) will further our mutual interests and give us increased legislative power. It has been a rather general experience that where veterinarians, unaided, have attempted to secure important legislation that was opposed, or have attempted to prevent vicious legislation that was supported; the struggle has very often been disappointing in results. It has also held true that in States where veterinarians could secure the support of stock-breeders and general agricultural interests, legislative work has been more effective. It may be set down as an unpleasant, but nevertheless bit of demonstrated truth, that medical men, either physicians or veterinarians, and particularly the latter, have relatively but little political power unless they can secure the backing of powerful financial or agricultural interests.

Such coöperative work as the REVIEW articles have noted and approved not only tend toward added political influence, but are distinctly educational for both the veterinarian and stockman. Not only should the veterinarian work in and with the stock-breeders' associations for the reasons already given, but for the more selfish and smaller reason of financial gain.

In the case of agricultural society work of any kind, the veterinarian's paper must be first of all practical, and have an immediate bearing on practical things. It may easily be made so interesting and helpful, that other papers will be wanted at the next and subsequent meetings.

For years the writer has been anxious to see veterinarians take a more prominent part in local and State and even national medical association work, and thus more rapidly gain the full respect and rank which is clearly a just due. The modern veterinarian has received good medical training and should deserve recognition as a medical gentleman, and be welcomed on any medical programme. I know of no way of gaining these important ends so easily and rapidly as by getting acquainted with neighboring physicians and by taking an active part in their various lines of association work.

Veterinarians should join medical societies wherever they are eligible, and they should not only join but take an active part in the work, present papers and take part in discussions. And by all means, when attending such conventions, veterinarians should be as well and neatly dressed as any man in the room. There is no question but that physicians are always ready to respect the intelligent and well-informed veterinarian, and take an active interest in his lines of work, whether they bear directly upon human practice or not. The ideas of the average physician concerning hog cholera, actinomycosis, glanders and bovine tuberculosis are crude and indistinct, to put it mildly. They need us on their programmes, and, by the way, we need them. There is no reason why there should not be a veterinary paper on the programme of every State medical society meeting, and upon a great many county and other local medical association programmes, and conversely medical papers on veterinary programmes.

When veterinarians are approached in private conversation with this argument, they are very apt to say, Yes, these things are all right, but how can we do them? Why, simply get acquainted with the secretaries of the agricultural and medical

societies; learn something about good stock, take an interest in agricultural matters, be ready to discuss subjects of immediate practical importance that will appeal to the practical stockman. Take a good medical journal, read it; be ready to discuss creditably questions of comparative medicine that often arise in medical society meetings, and furnish papers for their programmes. Veterinarians in public positions, either State or Federal, have abundant opportunities to become acquainted with secretaries of these associations, and while they may not care to take active steps to secure places on programmes for themselves, they may usually work in some capable friend who can present a valuable paper or discussion, and so do credit to the profession.

Unquestionably great good may be obtained by the individual veterinarian and great good be done the profession if more of us will take an active interest and a more active part in these allied association lines of work. (M. H. R.)

A PRINCELY ENDOWMENT TO VETERINARY EDUCATION.

We publish elsewhere a letter from Dean Leonard Pearson, of the Veterinary Department of the University of Pennsylvania, in which he announces some important results of recent legislation in the Keystone State. The most important item, possibly, is the signing by the Governor of the bill appropriating $100,000 to the Veterinary Department of the State University, and which, with a similar sum recently donated by an unnamed philanthropist, places the honored school in the very front rank of veterinary educational institutions of the country. The Dean intimates in his letter that further windfalls are in sight, and thus the possibilities multiply, for it is not nearly so difficult to obtain additional contributions as it is to secure the first recognition. We trust that the Keystone philanthropists and legislative solons may get the habit of bestowing endowments and appropriations upon that long-waiting and worthy department.

Aside from the munificence above referred to, the State of

Pennsylvania has taken the initiative in the establishment of an experiment farm for the investigation of infectious animal diseases, by appropriating sufficient funds to purchase and equip it, thus placing before the eyes of its sister States an example of progressive economy which may prove but the pioneer of such helpful adjuncts to preventive medicine.

These splendid results of the efforts of our *confrères* in Pennsylvania are not only gratifying in the extreme, but they point an important moral: which is that in unity there is strength; and in the case of the veterinarian, it could be stated more strongly: without unity, there is no strength. In the present instance, the members of the profession in Pennsylvania worked in perfect harmony, with a singleness of purpose which brought every influence into line for the one object; and their insistence was convincing because they were sincere believers in the righteousness of their cause. This method of operation has recently been successful in a number of States, and the opposite condition has as uniformly been unsuccessful.

The REVIEW, in its own behalf, and voicing the sentiment of the profession of the entire country, tenders its sincere congratulations to the veterinarians of the Keystone State, and hopes that their dearest anticipations may be realized in the benefits which will flow from their exceptional opportunities.

Next!

ARE YOU READY FOR CLEVELAND?

The time elapsing before the 1905 meeting of the American Veterinary Medical Association, which takes place in Cleveland, Ohio, August 18, 19, 20, 21, is growing very short, and there will be only two more numbers of this magazine in which to urge its readers (whether members of the Association or not) to arrange their affairs so that they may reap the great advantages to be derived from attendance upon its sessions.

For the past decade these gatherings have been growing in interest and importance, each year's transactions marking a distinct advance over its predecessor, and Secretary Repp assures

us that this habit is not to be deviated from on this occasion. Questions having the greatest influence upon the welfare of the profession, particularly in its relation to its educational institutions, will press for elucidation at this meeting, and it is the duty of every earnest veterinarian to contribute to the discussion the results of his thoughts upon this great problem. Papers will be presented for consideration by some of the leading scientific veterinarians of this and several foreign countries (including Germany, France, Japan, Australia and the Far Eastern dependencies of this country), upon all phases of veterinary medicine, while practical subjects will receive not only the benefits of discussion, but many will be illustrated in the clinical demonstrations.

There is no substitute for attendance: a *verbatim* reproduction of what occurs by means of descriptive writing and the use of the kodak does not compensate for all that is lost. Those who have indulged in these delightful yearly pilgrimages know how and why this is so. To all others, the REVIEW strongly advises that they make 1905 their initiative convention, and, unless they be professional adamants, they too will understand the reasons why attendance cannot be substituted.

Get ready for Cleveland!

THE original illustrated article by Dr. W. L. Williams, entitled "Rupture of the Pre-Pubian Tendon in the Pregnant Mare," announced to appear in this number of the REVIEW, has been delayed through failure of the artist to complete the drawings. The author assures us that it will certainly be ready for the July issue.

THE PENNSYLVANIA STATE BOARD OF VETERINARY MEDICAL EXAMINERS have succeeded in securing a law requiring all veterinary practitioners in that State to register annually in a registration book kept by the Board. To isolate and control illegal practitioners this act simplifies and minimizes the difficulties which beset the profession in States having practice acts.

ORIGINAL ARTICLES.

WHAT INVESTIGATION IS.

AN INQUIRY INTO THE MEANING OF SCIENTIFIC INVESTIGATION IN THE VETERINARY SCIENCES.

By D. Arthur Hughes, Ph. D., D. V. M., Cornell University, Government Inspector, East St. Louis.

"Good gentlemen, give him a further edge,
And drive his purpose on to these delights."

Hamlet, Act III.

"The other day an emphatic friend of mine committed himself to the opinion that, in England, it is better for a man's worldly prospects to be a drunkard, than to be smitten with the divine dipsomania of the original investigator. I am inclined to think he was not far wrong."

T. H. Huxley, "Universities: Actual and Ideal." (1874.)

If it were not that human nature tends to err and to forget there would never be any necessity to reflect upon the full meaning of scientific investigation in the veterinary sciences. Unfortunately there are two things which foster this forgetfulness, the one is, strange to say, the enthusiasm of specialists in a single science; the other, an outgrowth of the first, is the absence of profound reflection on the interfusion and co-relation of all the sciences.

What could be more common than the judgment that specialization tends to narrow-mindedness: what, indeed, is more true. It may be every day observed that the mental twist a man has from the personal conviction of the importance of the science in which he is a worker almost invariably makes his judgment on other sciences, and on other scientific workers, both because of his ignorance and because of his bias, worthless. We may with gratitude rely upon such a man's conclusions in his own science; but we may well turn away and smile when he attempts to speak *ex cathedra* on other sciences. Of what value, for example, are the judgments of a specialist, exclusively, in surgery on the work and conclusions on a strictly medical

case attended to by a specialist, exclusively, in medicine? Of what value is the judgment of a deep specialist in a branch of geology—like palæontology—on the methods of investigation and conclusions of a deep specialist in pathology? Nay, we need not go outside our own sciences: of what value is the judgment of an exclusive student of histology on the methods of investigation and conclusions of a man who is exclusively a specialist in abnormal histology. The two sciences are closely related, yet the dicta of the one can hardly be questioned by the specialist in the other. Respect, as we may, the knowledge of specialists in veterinary sciences; as a rule we must be amused, perhaps sometimes chagrined, at their limitations of knowledge exposed in their judgments on what constitutes investigation, on what is scientific method of investigation, on what the scientific spirit is, on what are scientific conclusions in other specialties than their own.

It is a commonplace of educational theory that no man can be a great specialist until he is first well read in many specialties besides the one of his choice. Fortunately we have some men in the profession to-day, and we will have more in the future as the demands become greater amongst us for profundity of learning, who are acquainted with the whole circle of the natural sciences, whose scholarship in the kith and kin of the natural sciences which constitutes the sum of those we should know is wide; men, who, while their faculties may be mainly exercised in one branch of medicine, are sufficiently acquainted with the others to be awake to the advantages of scholarship in the other branches. Unfortunately, except in these few, the stream of tendency has been for men particularly learned in a specialty to betray, in their judgments on investigations, perhaps related to but likely not in the line of their thinking, an ignorance born of incapacity to understand other points of view, or an ignorance of other methods of scientific procedure than their own. Though the family of the natural sciences which are enclosed in our own particular circle—veterinary medicine—are few in number they overlap one another

and are so interfused as sometimes almost to be inextricable. Here is a man attempting to discover the etiology of a certain set of phenomena—an obscure disease, let us say—can he fail to have his mind set to thinking upon the many consequences of the disease to the organism if the disease is systemic? Hardly, we would think. We are too apt to think a disease has one cause when it may have many: we are too apt to have the mind set on a single cause and to forget the many effects on the organism. In our concentration of mind on the investigation of a point in pathology we are apt to overlook other methods of investigation of the same point, to eschew other theories which might explain the phenomena found. Rabid with a worthy enthusiasm for a favorite method in a favorite specialty, we are likely to depend too much upon it and to expect too much of it. Failing to find our etiological factor to explain the disease, we are likely to find fault with our method; whereas we should find fault with ourselves. There may be many causes. Our point of view may be wrong. We expect our method to explain too much. In a word, by too great concentration on one point, on one method, in one specialty, we lose our hold on the many relationships a single group of phenomena may have to the organism; we have none of that profound reflection which would make us see these relationships. The great men in veterinary medicine, as in human medicine in the past, must be those who do not expect to solve the mysteries of nature by laying too great weight on a single method or a single theory. Scientific investigation may take a multitude of methods to come to conclusion on one point, to explain one mystery.

In order to ascertain what the true scientific spirit is, what should be the characteristic attitude of the broad-minded scientist to the work of others in his own science or in other sciences, we may well consider, first of all, the relationship of science to culture, or science as culture: for, if we can determine this, we can understand the spirit which gives birth to investigation and its products.

Science as culture: the relationship of science to culture.

Perhaps there has been in modern times no man in Great Britain who understood the meaning of culture so well, nor whose views on culture were so readily accepted, as Matthew Arnold. In his famous essay, *The Function of Criticism at the Present Time*, he has laid down the doctrine that culture is "to know the best that has been thought and said in the world," and he adds that this can only be obtained by constant reading and association with ancient and modern literatures. His first proposition we can readily accept for perfect culture "implies the possession of an ideal and the habit of critically estimating the value of things by comparison with a theoretic standard. Perfect culture should imply a complete theory of life, based on a clear knowledge alike of its possibilities and its limitations." But when we turn to his second proposition, that this perfect culture can only be obtained by exclusive and habitual imbibing of literature, all scientists who know their work and its values must demur. In the same way, in America, there has been no greater exponent of literature as the invariable channel for those who would possess perfect culture than Ralph Waldo Emerson. In his celebrated address before the Phi Beta Kappa Society at Harvard called "The American Scholar"—and its tone is in marked contrast in spirit and substance to the addresses delivered before the Honorary Scientific Society of Sigma Xi at Cornell—he has said substantially that the office of the American scholar is to receive a personal inspiration from a kind of uncritical, unanalytical adoration of Nature, from imbibition of the spirit of the past—by implication through literature. These are to give the American scholar his insight into the present. Both of these men had a true catholicity of spirit and a true sympathy with scientific thought, though both lacked appreciation of the weight of modern scientific thought and work in the sustenance and formation of culture in their times and since. The error into which both have fallen is the same. Both were among the most remarkable literary men of the past generation. Yet both, in a time which was distinctly a period of

scientific work and aspiration, missed true valuation of its purposes and its endeavors. The progress of science has been such that at present we are unwilling to admit that neither a nation nor an individual can really advance whose common outfit draws nothing from the natural sciences. Reliance upon literature alone as a means of cultivation of the faculties, or as an inspiration to intellectual endeavor, has been supplanted by the idea that the study of sciences has equal place with literature for discipline or for cultivation of keenness of mind.

This idea in modern education admirably vindicates itself by furthering scientific progress. We may therefore inquire now in what the scientific spirit, which furthers knowledge of nature and insures the new form of culture, consists. Grand as the conception of the means for finding culture, as espoused by men like Arnold and Emerson, is—the reliance in the inspiration of literary seers—the conception of the means of culture which obtains amongst men of natural science is grander: for it neither trammels nor bewilders the intellect. Note, first, the only place authority can hold in science; note, second, the right and the happiest pleasure the scientific mind at work has, to convince itself of natural truths; note, third, the purpose the scientific mind has when at work; note, fourth, the atmosphere in which the scientific spirit has its play and its being.

First, the only place authority can hold in science. At any moment in the history of any single science there is always a body of facts or principles or laws pertaining to that science which have been put through the fire of tests in continued experiment or observation and as a result of the ordeal scientific men have come to the united conviction that they are truths in that science. The eminent bacteriologist, Dr. Veranus Alva Moore, has given the term "dead-wood" to such facts, meaning that the facts are settled as facts. This is the only meaning that the term authority can hold in science. Yet the statement of fact even here is not unalterable; nor, on the last analysis, can it be said that any fact or body of facts is beyond dispute; for everything in science can be questioned by any other inves-

tigator who works them over, and the discovery of new facts often requires that old facts be re-stated in the light of later discoveries. Second, the right and the happiest pleasure the scientific mind at work can have, to convince itself of truths of nature. Science holds it as a cardinal doctrine that everything, in its store of truth, known or unknown, can be questioned and inquired into by any investigator. Its fondest hope is that each of its votaries will try old truths and prove them for themselves if they so desire; or that they will beat out new paths for themselves in the world of nature, that we may have a larger heritage of knowledge. It is the duty and the delight of the scientific mind to prove all things and hold fast that which is good. The right of personal inquiry until conviction is reached is never called in question. Third, the purpose the scientific mind has when at work. The scientist, young or old, can try all things in the crucible of his own mind. But the purpose, mainly, of the scientific mind is the noble ambition to enlarge the boundaries of knowledge of nature, either by following in the footsteps of the explorers of new fields of knowledge or else to find out new paths for themselves. Exploitation of new fields of nature; exploration of all her realms, this is the purpose of the scientist. Fourth, the atmosphere in which the scientific spirit has its play and its being. As the moral nature of man is greater than the intellectual, even so the moral spirit, which has governance of the scientist at work, marks him in his every effort. The very atmosphere he breathes, therefore, is charged with exhilaration for truth for its own sake. This power is a greater possession than much knowledge, as the moral incentives transcend the intellectual aspiration.

This spirit which governs the scientist, this atmosphere in which he lives, moves and has his being, keeps him in roads which lead to true culture. The value of science as a study which leads to perfect culture of manhood, whether on the intellectual or the moral side, is now obvious. John Stuart Mill, whose fame as a logician and political economist has gone abroad through many lands, and who was himself an ardent ad-

vocate of classical study, though his spirit was really characteristically scientific, has written a passage which, with some little change, applies equally, at least as strongly in scientific study and investigations, as it may in classical study, in which he meant it to apply, that it would be apropos to quote it here: "To question all things;—never to turn away from any difficulty; to accept no doctrine either from ourselves or from other people without a rigid scrutiny by negative criticism; letting no fallacy or incoherence, or confusion of thought step by unperceived; above all to insist upon having the meaning of a word clearly understood before using it, and the meaning of a proposition before assenting to it; these are the lessons we learn," "from workers in Science." "With all this vigorous management of the negative element, they inspire no scepticism about the reality of truth, or indifference to its pursuit. The noblest enthusiasm, both for the search after truth and for applying it to its highest uses, pervades those writers." "In cultivating, therefore," "science as an essential ingredient in education," "we are all the while laying an admirable foundation for ethical and philosophical culture." The habitual attitude of the worker in natural science towards truths new and old keeps his mind in a state of flux towards all new truth, opens his mind to all new enlightenment from whatever source. Such a mind with a ready wakefulness for new truth must of necessity be called cultivated as readiness to weigh and consider all truth is characteristic of the cultivated mind.

The error of narrowing down the meaning of the word Science.

Probably I will be considered venturesome by members of my own profession, and by scholars in natural science, when I attempt to point out the danger of a limited interpretation of the meaning of the word Science. In the older days there used to be a phrase bandied about—*odium theologicum*, the hatred of one school of theology for another—similarly is there not sometimes an *odium professorium*, a dislike, a mild dislike if you like, of a professor of one kind of science for another? A certain narrowness creeps in sometimes as to what true scientific work is,

of what science is. We may then consider, first of all, what is the really limited, though apparently broad, interpretation of the word science as it is used by workers in natural science; then come to a just and comprehensive idea of what is meant by science.

Science, according to the meaning used ordinarily by students and investigators in natural science, and particularly by the students of the biological sciences which come under the heads of veterinary and human medicine, may perhaps be said to be something as follows: "a knowledge of the phenomena of the Universe, as that which lies about the individual man: and of the rules which those phenomena are observed to follow in the order of their occurrence, which we term the laws of Nature." In a word, science is an exact knowledge of natural fact. The knowledge of the facts of natural science is obtained by the individual, not from bookishness, but from a direct perception of the facts and the practical exercise of the observing and reasoning faculties upon them. But actual knowledge of natural fact may, and often is, confounded with the process by which the facts are obtained: we should, therefore, inquire what is the process of obtainment. The secret of the acquisition of knowledge of natural science consists in proceeding from the easy to the difficult, from concrete items of knowledge to abstractions or conclusions based upon it. The secret of the process consists in the examination of natural phenomena one after another to discover their underlying facts and to reduce all new facts, all new powers, to their class and their law. So in the process of examination of things in nature the student of natural science sees the last fibre of organization in nature and infers its meaning by his insight. By observation and experiment the investigator in natural science comes to induction, or conclusion, and discovers causation.

The fault or error of this interpretation of the word science and of the scientific process consists in its limitation to natural science: so, it may be asked, what is the more just and comprehensive meaning of the word science. From its etymology, and

in its simplest interpretation, the word science means knowledge. But to be scientific, as now understood, the knowledge must have orderly arrangement. The word science cannot now be confined to absolute and provable knowledge of natural fact systematically arranged, for example it cannot be limited to facts in the biological sciences. The word and the process have been carried into every sphere of activity where exact knowledge is obtainable. The word science, the scientific process, the scientific spirit, have been carried into every field of activity where the mind of man ranges, so that a myriad of sciences, thoroughly as searching in their methods and in their call for exact knowledge, have appeared, where the word is used quite apart from its limited meaning in the natural sciences. Scholars in natural science are apt to forget that in economics, in the branches of sociology, to use but two illustrations, the stern satisfaction of truth for its own sake equally obtains.

Scientific progress: meaning of the expansion of knowledge: the law of progress.

If the word science has taken such a large meaning and if the scientific spirit has been carried into so many fields of knowledge—which cannot be denied—we may well reflect upon the cause of the change which has permeated all modern thought with the scientific spirit: for one aspect of this scientific movement was the foundation of veterinary colleges and the multiplication of courses of study in them. Mr. Herbert Spencer, in his essay: "Progress, its Law and Cause," has expounded and laboriously defended this statement of the law of progress. "Every active force produces more than one change—every cause produces more than one effect." We may take this dictum for granted, for it is everywhere, in natural sciences at least, scientifically defensible. The foundation of veterinary colleges and the differentiation of the veterinary sciences into a variety of studies was only another instance of the appearance of the scientific spirit in a comparatively new realm. The cause of the change is found in the law of progress. But intellectual progress in this, as in all the sciences, will depend upon two

things—freedom of thought and a hearty desire for the advancement of knowledge. No constrained view of what scientific work is, of what science is, can do anything but deter either the one or the other. In this science, as in all the sciences, it will be found that advances will be made by just those men who dare to doubt and who stoutly believe in the scientifically inculcated maxim that no statement has a right to be believed until it can be maintained beyond all refutation. As every rightful pleasure honorably exercised increases vitality, and as the exercise of the faculties for the advancement of knowledge is the most exhilarating of mental pleasures, scientific progress in veterinary medicine is assured in America to-day by this form of vitality exhibited in the profession.

The false notion that possession of the scientific spirit excludes the possession of other gifts of a high order by the same person.

Nor does the possession of scientific energy and a nature instinct with the scientific spirit exclude the possession and the exercise of other gifts of a high order by the same person. There has been at times much odium and rancor aroused by the combat of men intensely scientific in their longings and aspirations with men who stood stoutly for classical scholarship alone, that the result has been that these very scientists have failed to see that both the scientific and the literary gifts often enough co-exist in the same persons. Yea, more, have co-existed in the very persons who have, as scientists, entered most strongly into controversialism with men in literary camps. Some of these men have been almost equally eminent in Science and Letters. If the godlike gift of literary expression is possessed by a man fraught with the scientific temper his zeal in science gives edge to his literary gifts and arouses and dilates these faculties to their highest and noblest activity. Who of us has forgotten the strenuous life of Professor T. H. Huxley of the Royal Society, whose vindication of the cause of Science as opposed to Letters, by a sort of irony, won for him an equal place in both Science and Letters. He, a great Professor of

Comparative Anatomy, and by all odds an investigator of the highest gifts, has not lived to-day to see his scientific essays studied for literary excellence in the Universities. Herbert Spencer, also, who carried the habit of scientific research into the abstruse field of speculative philosophy, though his style is diffuse, has been turned to by literary scholars for points begotten of his scientific research in rhetoric: for his scientific essay on The Philosophy of Style touched the foundation principles of the rhetorical power which is both a science and an art. In America, also, was not the autocrat of American Letters, Oliver Wendell Holmes, all his life a Professor of Human Anatomy in the great Harvard Medical School. Is not David Starr Jordan, President of Stanford University, alike a scientific investigator, heart of the heart of Louis Agassiz, as shown in his three volumes on North American fishes, and also a writer with many graces of expression. Does Dr. James Law of our own profession lose any of his zeal for scientific research by his power to command respect as a writer?

We do not need to envy these men who possess the literary gift; rather we should be proud that these men who possess it possess also scientific gifts, scientific purposes and bear all towards scientific ends; who can patiently seek the truth in the science into which they bend their energies, and finding it, can speak of it truthfully and yet eloquently. A scientific truth is twice a truth when it can be so spoken of that it impresses men. We should be all the more on our guard against this false notion that the possession of the strongest scientific purposes and the instinct of research forbids the possession of a high power of expression: for scientific methods of research have had extension to all branches of learning in some of which literary power is absolutely necessary, in which also the spirit of scientific research has demonstrated its place. In History:—the Oxford Historical School calls itself rightly scientific in its methods for it applies the strictest scientific rules for weighing evidence to support historical fact. In Literature:—Scientific method largely has its sway. In Philosophy:—psychology has become

a study of mental phenomena through ingenious scientifically devised machines. Conversely renown as a philosopher and literary man does not necessarily viciate a man's habits of patient scientific discovery. Huxley was noted both as a man of no mean powers as a metaphysician and as a literary man; yet, at the height of his power, when he was honored by the Rectorship of Aberdeen University, he confessed himself nothing but a patient researcher in Comparative Anatomy. Huxley was not an anatomist of the domesticated animals, but largely of the anthropoid apes and of lower marine fauna. Nevertheless his work was the same in kind with our own in veterinary anatomy and the eminence to which he arose should have its bearing upon our judgment.

The scientific spirit at work: the methods of science.

As what holds in investigations in the natural sciences in general is true of investigations in veterinary medicine, I shall, first of all, propound five axioms which obtain in the natural sciences; then go on to speak in sequence of:—first, the place of reason in investigation; second, the place of observation; third, the place of experiment; fourth, the place of imagination; fifth, the course the intellect passes through in the formation of scientific theory; sixth, the way unanimity is reached by scientists upon scientific facts.

The scientific spirit at work has as confines these maxims or axioms. First, science must be cultivated not for love of money, applause, notoriety or continued fame, but for love of truth: knowledge alone is the end. Second, investigation is to be carried on for precise knowledge of natural fact. Third, the appeal in every case is not to authority, what anybody may have thought or said, but to nature. Fourth, wordings in statements of natural fact in all cases are imperfect. The truth is not to be sought in the language used to express it; but in the things, facts. Fifth, mere assertion outstepping evidence educible from nature is criminal.

The methods employed in scientific research are multiform; nevertheless advances are sought through the channels or meth-

ods now to be discussed. First, the employment of reason ; reason unrestrained and ample in its operation must be allowed if the goal of truth is to be reached. Second, observation, exhaustive, detailed, painstaking, is an element in the success of all scientific investigation. The original observer is he who notices relationships which others have overlooked. Third, experiment, which is really only artificial observation, is a favorite method to make nature give voice to her truths. But this method has its limitations. The knowledge obtained may be scanty and the data obtained insufficient. There may be two reasons why experiment may be unsatisfactory ; for the reason that the experimenter lacks ingeniousness in devising experiments ; for the reason that the experimenter may lack apprehension what experiments to try and to what end. But by this method of testing nature discoveries may be made, and, when made, can always be demonstrated by return to the same method devised. Fourthly, there is no boldness necessary to say that imagination is necessary in research. This, in science, is that power of the mind, well-ordered and disciplined by reason, which never turns away from the cold facts found, whereby we form conceptions of things in nature which we are investigating and proceed to see if the conception tallies with the facts, or the facts with the conception. This idea of the scientific imagination is far and away from the riotous and capricious exercise of the faculty in the sense sometimes used.

What now, fifthly, is the course the intellect passes through in the formation and vindication of scientific theory ; and, sixthly, how is unanimous agreement reached by scientists on scientific facts. A scientific theory is a conception of the human mind which, to find force amongst scientific workers, must receive verification in the world of nature. When a scientific theory has been conceived the theorist proceeds in his thought, by a vigorous analysis, to make out what phenomena in the actual world must be present and found, if the theory is to be substantiated. If, after a vigorous study of phenomena in the actual world he finds the phenomena in every case tally with the

theory, the presumption is strong in its favor. If in every case phenomena in the actual world observed by all other workers agree with the theory, its support grows still stronger. When, under similar conditions, by everyone and everywhere the phenomena are found to tally with the conception, the theory assumes the dignity of law and we rightly call it natural law.

Though the effort of the human mind in the formation and substantiation of a scientific theory represents a great exhibition of intellectual power; though the course the intellect passes through is a difficult one, the difficulty is enhanced by what must occur before there can be perfect agreement of scientists upon its truthfulness. Usually many theories are presented to substantiate a set of phenomena. Numerous independent seekers for truth carry out their researches according to varied methods. Each has zeal for his own theory. The theory which more nearly covers the truths must gradually enforce its own adoption. By a process of elimination of error and a more and more wide substantiation of a single theory, agreement is reached at last.

Science and the applications of science: the relationship of scientific discovery to practical usefulness.

Upon nothing has there been such a mass of footless talk and silly writing as upon what is called "pure and applied science." There is something of a sneer implied by the so-called practical people, who take advantage of the discoveries of patient investigators for private fortune, in their babble about "pure science," which is exasperating. In the profession of veterinary medicine who has not heard the remark, "he is very good in science; but no good in practice." The opinion seems to prevail amongst the shallow-minded that the greatest stock of scientific knowledge is a bar to personal, practical usefulness. Moreover, if the veterinary scholar has a particular penchant for research and pursues it at his leisure, let us say, with a furious ardor the zest is thought to be all the more disastrous to his practical utility. The worst of it is it sometimes turns out to be true, in which case there is reason for a smile. How-

ever were it not that in France, Germany, England and America the famous practitioners have all been avowedly men of wide knowledge of the facts of the veterinary sciences for which they are largely under obligation to researchers, and are themselves always seeking the newest facts from the latest researchers and themselves carry on many private researches, the stigma would be excruciating. We may now, therefore, with wisdom, point out the obligations of the appliers of scientific fact to the discoverers of scientific fact.

There are three classes of workers in science: those who aim to discover truths of nature, who make it their vocation by patience and persistence to unfold the truths of nature for the truth's own sake; those who lay hold of and disseminate these truths, whose vocation is to teach the truths obtained by the investigators; those who lay hold of the truths and apply them in the trades, in the manufactures, in the mercantile arts, in the scientific professions for personal aggrandizement, for the safety, the comfort or the luxury of mankind.

We in America are so carried away with joy in our material progress, largely obtained by the application of scientific knowledge to practical utility that we are apt to forget the obligations we owe to the patient, unselfish toilers in scientific research, whose labors, carried on through centuries, anteceded the application of the knowledge they accumulated and without which no application would have been thought of or would have been possible. We boast the invention of the electric telegraph, forgetting the accumulated facts obtained in silent research which allowed their application to invention, of Volto who discovered the source of electricity, of Faraday who discovered the relation of magnetism to electricity, of Ohm who discovered the voltaic circuit, of Ampère who discovered means of measuring electric power. We ignore the work of the quiet, silent researchers at our peril: for any advances in the ascertainment of scientific fact must always antedate their application in practical utility. Similarly in the profession of medicine we talk loudly of sepsis and are careful to show ourselves scientific by utilizing our

knowledge of it, forgetting Lister and his discoveries, forgetting the observations, the researches which led to the adoption of the principle of antiseptic surgery and gaged the antiseptic value of drugs. We talk loudly of infection, forgetting that the very word has wrapped up in it the whole history of bacteriology, the youngest and mightiest biological science applied in medicine. It has taken thousands of researches to insure exact knowledge at every step this science has made in discovery of an etiological factor in a bacterial disease: yet medicine has had to halt and wait until bacteriology had decided upon the truth of each specific factor before it could adopt the truth and apply it professionally. You who forget how those who apply the truths which patient research obtains have labored, should listen to the words of Cuvier, himself a comparative anatomist, than whom no greater scientist has arisen in France: "These grand practical innovations are the mere applications of trnths of a higher order, not sought with a practical intent, but which were pursued for their own sake and solely through an ardor for knowledge. Those who applied them could not have discovered them; those who discovered them had no inclination to pursue them to a practical end. Engaged in the high regions whither their thoughts had carried them, they hardly perceived these practical issues, though born of their own deeds. These rising workshops, these peopled colonies, those ships which furrow the seas—this abundance, this luxury, this tumult—all this comes from the discoveries of science, and it all remains strange to them. At the point where science merges into practice, they abandon it, it concerns them no more."

Investigation a question of motive.

The question of whether a piece of work undertaken is scientific or not simmers down into a question of motive; and the truth of this is brought out strongly by contrasting the objects of studying science of the mediævals and moderns respectively.

The whole strength, such as it was, of the mediæval mind was directed to using the objects of external nature in support

of theological dogma. The only thought the mediæval scholar had in directing attention to the actual world was to illustrate some doctrine of the Church and enforce it for the advantage of discipline and control of the faithful. Strange freaks did their riotous imaginations make of external objects. At once pitiable and amusing is this exhibition of their motive displayed in their religious books. Curiosity, the desire to pry into things, was the devil working in men for the ruin of their souls. Andrew Dickson White, in his Warfare of Science with Theology, Chap. XIX, Pt. 2, says: "As a matter of course in the early Church and throughout the Middle Ages all such studies in nature were cast in a theologic mould. Without some purpose of biblical illustration or spiritual edification they were considered futile; too much prying into the secrets of Nature was very generally held to be dangerous both to body and soul." "In place of research came authority—the authority of the Scriptures as interpreted by the Physiologus and the Bestiaries—and these remained the principal source of thought on animated Nature for over a thousand years." "Like all else in the Middle Ages this sacred science was developed purely by theological methods. Neglecting the wonders which the dissection of the commonest animals would have afforded them, these naturalists attempted to throw light into nature by ingenious use of scriptural texts, by research among the lives of the saints, and by the plentiful application of metaphysics. Hence even such strong men as St. Isodore of Seville treasured up accounts of the unicorn and dragons mentioned in the Scriptures and of the phœnix and basilisk in profane writings. Hence such contributions to knowledge as that the basilisk kills serpents by its breath and men by its glance, that the lion when pursued effaces his tracks with the ends of his tail, that the pelican nourishes her young with her own blood, that serpents lay aside their venom before drinking, that the salamander quenches fire, that the hyena can talk with shepherds, that certain birds are born of the fruit of a certain tree when it happens to fall into the water, with other masses of science equally valuable."

What a contrast is the modern motive for questioning Nature. The motive for studying natural science is solely to question Nature, to find out her secret, hidden, elusive workings. The purpose is a faultless regard for and search for truth and examination for the truth only. The motive of the inquirer is tested by the following criteria: 1, has the inquirer humility of spirit "gladly would he learn and gladly teach;" for the quiet submissiveness is characteristic of the learner, the searcher; 2, freedom from bigotry, willingness to change his mind unhesitatingly under new light; 3, earnestness, a noble enthusiasm for enlightenment; 4, fearlessness which proclaims the truth when found and stands for it come what may; 5, self-sacrifice, for he of proper motive is willing to endure all and do all for the truth's sake; 6, doubt, honest doubt, freedom from gullibility at any turn.

The right of free inquiry in Science now unquestioned both at the Universities and outside of them.

The Universities must be the places where the free inquiry into the truths of Nature must be encouraged. The spirit of the place, the spirit of the men, the books, the laboratories, the appliances all are a spur and an encouragement to investigation. But it must not be forgotten that the Universities have not an embargo on science; that truth is not entrenched there, nor there to be sought alone. Nor must it be forgotten that the right of free inquiry in Science at the Universities, now unquestioned, is of recent origin. Men like Huxley and Spencer, who have but recently passed from amongst us, had to fight royal battles in support of this right which now goes unquestioned, and to plead with gifts of tongue and pen for the admission of natural science and its methods to the Universities. Andrew Dickson White, who is still amongst us, had to fight for two decades after the foundation of Cornell University that free inquiry in science be unopposed, and was in constant imbroglio with fanatics on this question. The right of free inquiry in science has prevailed, the time-spirit accords with this principle alike outside the Universities and within them. This

is a great concession to science. How great a concession it is will not be seen by all. Ability to comprehend scientific truth depends upon possession of scientific gifts and their development. Those who are not scientifically disposed are scientifically blind: eyes have they and see not; ears have they and hear not, neither do they understand. But to those who have the scientific spirit and who are capable of exercising scientific faculty enough to see the truth as it is, the right of free inquiry in Science, now unquestioned, is a great battle won.

How the free play of the scientific spirit has influenced the development of the veterinary sciences.

A science remains undeveloped in proportion to its independence: as soon as it is perceived that sciences have interdependence at that moment their development begins. This has been true of the relation discovered of the veterinary sciences to medicine. The study of veterinary medicine in America as a branch of natural science is hardly more than forty years old. At that time, forty years ago, there was gross ignorance among the people on infections ; that was before the formation of the Bureau of Animal Industry, when hardly a veterinary college was to be found in the land. With the recognition of the rights of research and the free play of the scientific spirit everywhere came the recognition of the value of the veterinary sciences to national wealth and public health. Shortly there came an alliance of veterinary faculties with State institutions for the furtherance of these State interests. This alliance brought about a further consummation which was devoutly to be wished, a change in conditions of veterinary study. The alliance of veterinary faculties with State institutions and the foundation of veterinary chairs at State institutions allows the pursuance of veterinary training at places where the freest scientific inquiry is fostered: it has brought to light the multiplicity of the veterinary sciences as biological studies and their necessary coördination into a single profession. The scientific atmosphere in which a student is placed at such institutions, therefore inspires him, if that capacity is within him, with the

spirit of research. Again, if the expansion of intelligence is possible in him, by virtue of the multiplicity of studies, in the course through which he has to pass, his scientific horizon is widened so that he cannot help but recognize the value and necessity of research.

The question "what investigation is," which looks simple, is really complex.

The question, "what investigation is," which seems so simple, is, on analysis, not so simple as it seems. Like many another simple question its answer involves great complexity. The other question, "the meaning of scientific investigation in the veterinary sciences" is equally as involved. The answers to both resolve themselves into a question of motive. What is the motive of the investigator? What spirit animates him? What are his purposes? We judge these things by the outcome of the work, by the product. The word science can hardly be confined to the natural sciences, nor the scientific spirit confined to labor in natural science. If the purpose of the investigator is a faultless regard for truth, then the scientific spirit, beyond all refutation, is present. If the outcome of the investigation, or the result of the faultless pursuit of truth, is fact undoubted by all men of sufficient intelligence to recognize the validity of the truth obtained, the investigation has been a scientific one, and the conclusion is scientific knowledge.

At least everyone will grant this is the interpretation of the meaning of investigation in the natural sciences. Let us carry this interpretation into the veterinary sciences which are all branches of natural science. Now will appear the reason why I have, in this paper, taken this circuitous route to come to my conclusions. The object of any investigation in any branch of natural science, including any branch of veterinary science, is the advancement of knowledge or the ascertainment of new facts in that science. How is this advancement of knowledge to be made? How are the new facts to be obtained? In my discussion of the methods of science and the process the scientific mind passes through I treated, tentatively, of the construction

of theories in science as a means of explanation of phenomena. We may now analyze scientific theory in another way, or at least look at it from another viewpoint.

The changeableness of scientific theory.

The late Professor Henry Drummond of Glasgow University used to say that, at least at the end of every five years, the great majority of scientific papers and books should be relegated to the top shelf or the dust heap: for so rapid are the advances in science and so changeable is scientific theory that constant readjustment must be made of statement to suit new facts. Since the removal of the ban upon curiosity there has been a constant reformation of theory to suit newly ascertained facts. Much of the explanation of ascertained facts in natural science is hypothesis or theory which may be upset by new facts to-morrow. Theory is so changeable as to seldom reach the dignity and unquestionableness of natural law. Yet the ascertainment of scientific fact and its theoretical explanation constitutes an important part of scientific work. In the work of natural science the theory formed to explain ascertained facts may not only be overturned by new knowledge but, in scientific discussion, it may be adjudged unsound as explanation of facts originally obtained. A variety of theories may be advanced to explain scientific facts. To-day one theory may prevail: to-morrow another. Hence we find Robert Koch in the seventies obtaining the agreement, apparently, of the scientific world, that bovine tuberculosis and human tuberculosis are caused by one and the same germ, in no way to be differentiated in bacteriological appearance; hence, in 1901, we find him taking the opposite view and advancing the theory that the bacilli of each disease are differentiable from one another, and there is no danger from intercommunicability.

As many theories may be advanced to explain scientific fact are not the men who advance these theories, which to them suitably explain facts they obtain, original investigators? Certainly! Following Koch's statements in 1901 came a whole snowstorm of pamphlets containing the results of innumerable investigations carried on by scientific men the world over which

tended to disprove his new theory. Are not all these independent workers original investigators? All are ardently studying facts or reaching forth for new ones. All are investigating and theorizing. Various facts are discovered. Various theories are raised to explain facts. Hence the babble. From the midst of the babble will be produced, as a result of the ardor of the investigators with varied theories, a body of facts regarding the disease, agreeable or not agreeable to the notion of transmission of the disease from animals to man, which, in statement completely corroborated, will assume the dignity of natural law.

What shall we judge to be scientific investigation in the veterinary sciences: In what shall the subject matter consist: What form shall it take.

Scientific investigation in a branch of veterinary science is the ardent pursuit by whatever method of new facts in that science. This definition needs explanation, perhaps emendation. The results may be positive or negative. The emphasis should be placed on the words *ardent pursuit.* For, even though the results of a piece of research, carried out with ardor, may be negative, the work was none the less an investigation while the scientific temper prevailed. Think of the disease tuberculosis as a subject for investigation at the present time. Consider for a moment some of the unsettled questions pertaining to the disease, and some of the methods which must be employed by scientific investigators before these questions are settled.

The two main questions upon which it is vain to think there is agreement are: Can bovine tuberculosis be transmitted to man with a probable result that he will eventually die of the disease; Can human tuberculosis be transmitted to cattle with a probable result that the disease transmitted will be fatal? The second question is largely a matter of observation and experiment. But the first question is largely a matter of observation alone. To experiment in this case would be a crime punishable as murder. The reliance must be in statistics. Agreement of scientists on these questions, how shall it be brought

about. In the second question the course is easy, corroborative experiments will bring agreement. Mark, though, that the work of each man in experimentation and observation, whether or not the evidence he produces is corroborative, is original investigation. In the first question the observations of physicians and other scientists of cases of supposed transmission of the disease from animals to man must be collected. The work of collectors of such data, the criticism of it and of conclusions drawn, is in the strictest way scientific investigation and the conclusions are in the strictest sense scientific conclusions. For no other method in this case can be devised by science to form the conclusions. This illustrates the multiplicity of methods which may be employed in investigations in natural science to come to valid scientific conclusions.

In what shall the subject-matter of an investigation in veterinary science consist? If we turn to my favorite subject of pathology we may see that the answer to even this is not simple. Consider the question of rabies. What is the etiological factor (cause) of rabies? How are the changes in the nervous system in rabies caused? What, histologically, are these changes? In each of these questions which will be ultimately investigated and answers determined, various branches of veterinary medicine:—physiology, histology, bacteriology, are inextricably interfused. The subject-matter of each question may take many phases according to the personality of the investigator, the phase of each question which may appeal to him. Each phase reveals problem beneath problem, though the young investigator does not realize this until he is at work. The search for new facts may involve only a part of each question. The solution of any of the questions will likely come from the working over, research, in each phase of the subject-matter by many hands and many minds before a settlement will be made of any question.

Where shall investigation in the veterinary sciences be done? By whom shall it be done?

In my discussion of the place the colleges and universities

hold in the fostering and continuation of research, it may appear that I believe them to be a sort of repository of truth, or the one place where the truths of nature may be sought out. No conclusion could be more ridiculous. Research may be carried on outside the university as well as in it. Galileo's discovery of the moons of Jupiter, the investigations of Copernicus and Kepler overthrowing the Ptolemaic theory in astronomy, were done away from colleges and without the aid of costly apparatus. In our day inventions, which are applications of facts of science to mechanical utility, are, almost to the last one, done away from colleges. The new facts in infections must be observed by investigators who cannot be in touch with laboratory appliances. The work of Jenner, in his simple and immediate observations as a physician, was the beginning of our present elaborate knowledge of toxins and antitoxins.

The wide application of the term scientific investigation.

The term scientific investigation has a far wider meaning than is commonly put forth for it. Students of natural science, and particularly students of the veterinary sciences, should be on their guard against narrowing the meaning of scientific investigation to a meagre portion of laboratory work. The term has a far grander meaning than that. Multitudes of observations leading to the most important conclusions in natural science have been made without the aid of any laboratory appliances whatever. The observations of Charles Darwin which are revealed in his works, The Origin of Species, and The Descent of Man and his conclusions on natural selection were made without any such artificial aids. Agree or not agree, as we may, on what are the mental or moral characteristics of the investigator, in natural science, or in any other science where exact knowledge is to be looked for and found—in manufactures, in the industries, as well as in more abstruse subjects like philosophy, where the scientific mind of Herbert Spencer successfully had its play, in all, what crowns a man an investigator is love of truth for its own sake, the pursuit of exact knowledge unflinchingly. We look only for " things as they are." The investigator's ideal

is aptly expressed by Rudyard Kipling in the last lines of L'Envoi :

"Only the master shall praise us,
And only the master shall blame;
And no one shall work for money,
And no one shall work for fame;
But all for the joy of the working,
Each in his particular star;
We shall paint the things as we see them,
For the God of *things as they are.*"

THE EFFECT OF TUBERCULOSIS VACCINATION UPON CATTLE INFECTED WITH TUBERCULOSIS.[1]

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AND

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During recent years a large amount of work has been done by Koch, Trudeau, de Schweinitz, von Behring, Maragliano, Fraenkel, and others, for the purpose of discovering and developing a specific treatment for tuberculosis. This work has taken various directions, and has included experiments wherein the toxins of tubercle bacilli have been administered and experiments wherein antitoxins found in the blood of animals that have been treated with toxins have been used. Toxins of various kinds have been employed ; from the original and new tuberculin of Koch to the toxalbumin, the watery tuberculin, the tubercle bacilli deprived of fat of Maragliano, and bacillary pulp.

The antitoxins that have been used have been developed as a result of the injection of the various toxins mentioned above, and also living tubercle bacilli of low virulence.

The reports of the therapeutic experiments made upon infected animals with tuberculosis toxins and antitoxins are

[1] Read before the Pathological Society of Philadelphia, Dec. 22, 1904.

numerous, but cannot be regarded as convincing. Most of these experiments have been made upon rabbits and guinea-pigs. Neither rabbits nor guinea-pigs are altogether satisfactory for experiments of this kind; the former because of their comparative immunity to tubercle bacilli of the human type, the latter on account of their excessive vulnerability to inoculation tuberculosis of either of the mammalian types. Enough work has been done to denote that the progress of a tuberculous infection may be controlled in some degree by specific means. It is important that these various methods shall be compared and measured both quantitatively and qualitatively. There is here a large and important field of labor for the critical experimentalist.

Among the means that have been proposed for controlling the spread of tuberculosis among cattle is vaccination, or the inoculation of animals with living cultures of tubercle bacilli of low virulence for the animals upon which they are inoculated. This method of producing artificial immunity has been the subject of considerable study both in this country and in Europe, and has been reported upon to this Society by the writers of this paper.

In connection with some tuberculosis vaccination experiments made by the writers, the opportunity occurred to test the effect of vaccination upon some young cattle already infected with tuberculosis. As this treatment appears to have had a decided effect upon the course of the disease in the infected animals treated, it is considered that our observations should be placed upon record, especially since the work covered nearly two years, long enough to show definite results, and is the first of the sort of which we have knowledge.

In testing with tuberculin a large herd of shorthorn and grade shorthorn cattle in December, 1902, that was known to have been infected with tuberculosis for a number of years, it was found that practically all of the members of the herd responded affirmatively to the test. Among the animals so responding were twelve calves from six to eight months old. As these

calves had mingled rather freely with the members of the herd, and as they had been reared on the milk of extensively tuberculous cows, it was not surprising to find that they responded to the tuberculin test. These twelve calves were obtained for use in this experiment. They were shipped to Philadelphia and were placed in a temporary building on the grounds of the veterinary school, where they were kept apart from other cattle.

The twelves calves were again tested with tuberculin February 2, 3, 1903. All responded to this test. They were then weighed and divided into two lots, of six each, as nearly equal as possible in respect to age, size, weight, and condition. One of these lots was subdivided into two groups of three each.

The three calves of one of the sub-groups were given seven intravenous injections of a standard suspension[1] in water of tubercle bacilli of human type (culture M). The dosage began at 1 c.c. and was increased to 6 c.c. The intervals between injections were from six to twenty days, and the period covered was from February 9 to May 1, 1903, as is shown by the protocols. These same calves received another and final intravenous injection of 5 c.c. of a standard suspension of living tubercle bacilli (culture M) about a year later, March 29, 1904.

The three calves of the second sub-group were given subcutaneous injections of tuberculin at intervals of from two to ten days. The injections of tuberculin were repeated until the hypersensitiveness of the animal to tuberculin had disappeared, after which the calves received an intravenous injection of a suspension of tubercle bacilli (culture M) in water. Following each intravenous injection of living tubercle bacilli, the animal was again given tuberculin a number of times until its hypersensitiveness to tuberculin again disappeared. The procedure in these cases in respect to the order of the injections of tuber-

[1] By a standard suspension is here meant a suspension of tubercle bacilli in water, in such quantity as to give an opacity equal to that of a twenty-four-hour culture of typhoid bacilli in bouillon; 1 c.c. of such a suspension is estimated to contain the equivalent of 0.0013 gram of tubercle bacilli dried ten days in a desiccating chamber over calcium chloride.

culin bacilli was as follows: Two subcutaneous injections of tuberculin, an intravenous injection of tubercle bacilli, six injections of tuberculin, an injection of tubercle bacilli, six injections of tuberculin, an injection of tubercle bacilli, three injections of tuberculin. The period of treatment extended from February 9 to April 30, 1903, inclusive; the exact times of administration and the doses are shown by the protocols. The calves of this group, as of the first group described, were given an intravenous injection of 5 c.c. of standard suspension of living tubercle bacilli (culture M) March 29, 1904. Following this, tuberculin was administered five times at intervals of three or four days.

The remaining six calves were given no treatment whatever, but were, at all times, kept with the six calves under treatment; so that all of the twelve calves in this experiment were subjected to the same conditions of life and subsisted upon the same kind and quantity of food.

All of the calves were kept in a stable until May 29, 1903, when they were placed upon pasture, which became very scanty during the latter part of the season. During the winter of 1903-04 the cattle were fed mixed hay, corn fodder, and a grain mixture of bran and corn meal. Only a little grain was fed. About the middle of May, 1904, the cattle (now about two years old) were again placed on pasture, where they remained until they were killed at the close of the experiment.

Two cattle, both controls, died; the first one May 5, 1903; the second September 13, 1904; two, one control and one treated, were killed April 4, 1904, and the rest were killed in September, 1904.

When the cattle in this experiment died or were killed they were submitted to careful post-mortem examination. Material was stained for examination for tubercle bacilli and guinea-pigs were inoculated from the lesions of some of them. Histological examinations of the lesions were made by Dr. C. Y. White, to whom we are greatly indebted for reports upon his examinations.

The treatments and post-mortems are summarized in the following protocols:

FIRST GROUP.—*Three calves that received intravenous injections of tubercle bacilli alone.*

FIG. 1.—*Red Bull* (16,013).

1902.	December	19.	0.1 c.c.	tuberculin;	reaction.			
1903.	February	2.	0.8 c.c.	"	"	to 106.2° F.		
"	"	9.	0.0013 grm.	human	tubercle	bacilli,	intravenously.	
"	"	18.	0.0032	"	"	"	"	"
"	March	2.	0.0039	"	"	"	"	"
"	"	21.	0.0039	"	"	"	"	"
"	April	4.	0.0052	"	"	"	"	"
"	"	10.	0.0065	"	"	"	"	"
"	May	1.	0.0078	"	"	"	"	"
1904.	March	29.	0.0065	"	"	"	"	"
"	September	15.	Killed					

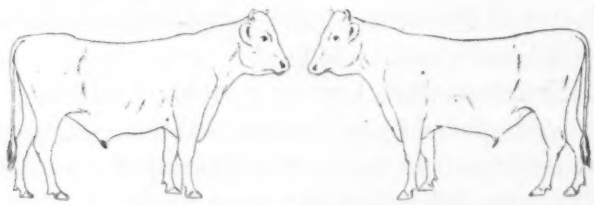

FIG. 1.

Right lung. Left bronchial gland.

Necropsy.—Weight 643 pounds; fair condition. The lesions of tuberculosis found in this animal were as follows; At the lower border of the middle lobe of the right lung was a slightly depressed area about one-half inch in diameter containing a collecton of thick yellow pus filling a cavity the size of a large pea. The walls of this cavity are one-eighth of an inch thick, white, and of firm, dense texture. In one of the left peribronchial glands there is a caseocalcareous nodule about the size of a pea and having the appearance of a wholly closed process. Guinea-pigs inoculated from a lesion in the lung became tuberculous.

FIG. 2.—*Red-and-white Bull* (16,017).

1902.	December	19.	0.1 c.c.	tuberculin;	reaction.	
1903.	February	2.	0.8 c.c.	"	"	to 105.6° F.

1903.	February	9.	0.0013 grm.	human	tubercle	bacilli,	intravenously.
"	"	18.	0.00325 "	"	"	"	"
"	March	2.	0.0026 "	"	"	"	"
"	"	21.	0.0039 "	"	"	"	"
"	April	4.	0.0052 "	"	"	"	"
"	"	10.	0.0065 "	"	"	"	"
"	May	1.	0.0078 "	"	"	"	"
1904.	March	29.	0.0065 "	"	"	"	"
"	September	15.	Killed.				

FIG. 2.
Postpharyngeal gland.
Left bronchial gland.
Mediastinal gland, middle and posterior.

Necropsy.—Weight 467 pounds; good condition. The following lesions of tuberculosis were found: In one of the left peribronchial glands a yellow, caseous area one-tenth of an inch in diameter. In the posterior mediastinal gland there is an area the size of a pea, yellow in color and quite calcareous, surrounded by a white, dense capsule. In the middle mediastinal gland there is a similar area, though much smaller, being but one-twelfth of an inch in diameter. In one of the postpharyngeal glands there is a caseocalcareous area one-half of an inch in diameter, surrounded by an unusually thick, dense, white fibrous wall. The caseous collection contains many calcareous grains. There are also in this gland three other similar areas, much smaller, about one-eighth of an inch in diameter, and each is surrounded by a dense capsule. In addition to this evidence of tuberculosis it was observed that both lungs, although generally well inflated, were heavy, soggy, somewhat leathery and without elasticity. There were some small areas where the tissues were contracted and dense. Histologically these areas show numerous dense bands of connective tissue. The blood-vessels are very much thickened. In limited areas some of the

smaller ones are almost obliterated. Some of the smaller sublobules show the lung tissue to be collapsed or organized. The peribronchial lymphatic tissue is increased and the pleura is thickened. There is no caseation or evidence of a tubercular process excepting as above noted. Guinea-pigs inoculated with the caseocalcareous material from the thoroughly encapsulated lesions in the postpharyngeal glands became tuberculous.

FIG. 3.—*Roan Heifer* (16,021).

1902.	December	19.	0.1 c.c. tuberculin ; reaction.
1903.	February	2.	0.08 c.c. " " to 106° F.
"	"	9.	0.0013 grm. human tubercle bacilli, intravenously.
"	"	18.	0.0026 " " " " "
"	March	2.	0.0026 " " " " "
"	"	21.	0.0039 " " " " "
"	April	4.	0.0052 " " " " "
"	"	10.	0.0052 " " " " "
"	May	1.	0.0065 " " " " "
1904.	March	29.	0.0065 " " " " "
"	September	15.	Killed.

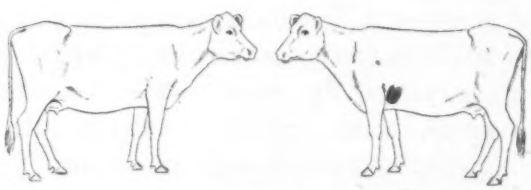

FIG. 3. Left lung.
Left bronchial gland.

Necropsy.—Weight 465 pounds; good condition. The evidence of tuberculosis here consists in a very dense condition of the lower half of the posterior flap of the anterior lobe of the left lung, which is attached to the posterior lobe and to the pericardium and the diaphragm. This dense mass consists of a very thick wall of fibrous tissue surrounding a sequestrum of lung tissue, about one and a half inches in its anteroposterior and two and a half inches in its vertical diameter. Above this mass the lung tissue of the anterior lobe contains an excessive quantity of fibrous tissue appearing as white bands between the lobules. These bands are quite firm and are from one-eighth to

one-quarter of an inch wide. The parenchyma surrounded by these bands is studded with fine dots and lines of white, consisting of fibrous tissue. Above this sclerotic zone the lung tissue is elastic and pink. There are nowhere nodules or caseous areas, excepting in one of the left peribronchial glands which contains a caseocalcareous nodule the size of a pea.

There is reason to believe that in this animal there has been an extensive area of tuberculous tissue in the lower portion of the anterior lobe of the left lung. This area appears to have become encysted and the lung tissue above to have been the seat of numerous small tubercles which were transformed into scar tissue and appear now very much hardened and contracted.

SECOND GROUP.—*Three calves which received intravenous injections of tubercle bacilli alternating with repeated subcutaneous injections of tuberculin.*

FIG. 4.—*Red-and-white Heifer* (16,015).

1902.	December	19.	0.1 c.c. tuberculin; reaction.
1903.	February	2.	0.8 c.c. " " to 105.8° F.
"	"	9.	1.0 c.c. " " to 102.8° F.
"	"	15.	1.5 c.c. " " to 103.0° F.
"	"	18.	0.0026 grm. human tubercle bacilli, intravenously.
"	"	22.	1.0 c.c. tuberculin; reaction to 103.0° F.
"	"	24.	1.5 c.c. " " to 102.6° F.
"	March	4.	2.0 c.c. " " to 104.6° F.
"	"	6.	2.5 c.c. " " to 102.8° F.
"	"	11.	3.0 c.c. " " to 103.0° F.
"	"	14.	3.5 c.c. " " to 103.0° F.
"	"	21.	0.0039 grm. human tubercle bacilli, intravenously.
"	"	27.	1.0 c.c. tuberculin; reaction to 103.0° F.
"	"	29.	1.5 c.c. " " to 103.0° F.
1903.	April	5.	2.0 c.c. tuberculin; reaction to 102.6° F.
"	"	8.	2.5 c.c. " " to 102.2° F.
"	"	10.	3.0 c.c. " " to 104.0° F.
"	"	16.	3.5 c.c. " " to 103.6° F.
"	"	18.	0.0052 grm. human tubercle bacilli, intravenously.
"	"	23.	0.5 c.c. tuberculin; reaction to 104.6° F.
"	"	27.	1.0 c.c. " " to 102.6° F.
"	"	30.	2.0 c.c. " " to 103.6° F.
1904.	March	29.	0.0065 grm. human tubercle bacilli, intravenously.

1904.	April	1.	1.0 c.c. tuberculin;	reaction	to 102.8° F.
"	"	3.	2.0 c.c.	"	" to 103.3° F.
"	"	8.	3.0 c.c.	"	" to 102.4° F.
"	"	11.	4.0 c.c.	"	" to 102.9° F.
"	"	15.	5.0 c.c.	"	" to 103.8° F.
"	September	15.	Killed.		

FIG. 4.

Left bronchial gland.

Necropsy.—Weight 566 pounds; good condition. The only evidence of tuberculosis in this animal is a calcareous nodule one-eighth of an inch in diameter situated in one of the left peribronchial glands. This nodule is sharply differentiated from the surrounding adjacent, quite normal glandular tissue, and has the appearance of a completely closed process. Guinea-pigs inoculated with an emulsion of this nodule developed tuberculosis.

FIG. 5.—*Red-and-white Heifer* (16,019).

1902.	December	19.	0.1 c.c. tuberculin;	reaction.	
1903.	February	2.	0.8 c.c.	"	" to 105.6° F.
"	"	9.	1.0 c.c.	"	" to 103.4° F.
"	"	15.	1.5 c.c.	"	" to 102.8° F.
"	"	18.	0.0026 grm. human tubercle bacilli, intravenously.		
"	"	22.	1.0 c.c. tuberculin;	reaction	to 104.0° F.
"	"	24.	1.5 c.c.	"	" to 103.8° F.
"	March	4.	2.0 c.c.	"	" to 103.8° F.
"	"	6.	2.0 c.c.	"	" to 103.2° F.
"	"	11.	3.0 c.c.	"	" to 104.2° F.

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1903.	March	14.	3.5 c.c. tuberculin;	reaction	to 103.8° F.
"	"	21.	0.0039 grm. human tubercle bacilli, intravenously.		
"	"	27.	1.0 c.c. tuberculin;	reaction	to 104.6° F.
"	"	29.	1.5 c.c.	"	" to 102.6° F.
"	April	5.	2.0 c.c.	"	" to 102.8° F.
"	"	8.	2.5 c.c.	"	" to 103.2° F.
"	"	10.	3.0 c.c.	"	" to 102.6° F.

1903.	April	16.	3.5 c.c. tuberculin; reaction to 103.0° F.
"	"	18.	0.0052 grm. human tubercle bacilli, intravenously.
"	"	23.	0.5 c.c. tuberculin; reaction to 102.8° F.
"	"	27.	1.0 c.c " " to 102.4° F.
"	"	30.	2.0 c.c " " to 103.8° F.
1904.	March	29.	0.0065 grm. human tubercle bacilli, intravenously.
"	April	1.	1.0 c.c. tuberculin; reaction to 102.9° F.
"	"	4.	2.0 c.c. " " to 103.0° F.
"	"	8.	3.0 c.c. " " to 103.0° F.
"	"	11.	4.0 c.c. " " to 103.8° F.
"	"	15.	5.0 c.c. " " to 102.4° F.
"	September	15.	Killed.

FIG. 5. Left bronchial gland.

Necropsy.—Weight 580 pounds; good condition. One of the left peribronchial glands contained two nodules, each about one-tenth of an inch in diameter. Both are distinctly calcareous and are sharply differentiated from the immediately adjacent, quite normal gland tissue.

The right lung is rather dense and leathery and contains some collapsed areas. In such a collapsed area there is found an infiltration of round cells surrounding the bronchial walls. The lymphatic nodes in the same region are greatly increased. The alveoli are œdematous and in some places the exudate has undergone organization.

There is no evidence of caseation or of tuberculosis in the lungs or elsewhere, excepting as noted in the left peribronchial gland.

FIG. 6.—*Red Heifer* (16,022).

1902.	December	19.	0.1 c.c. tuberculin; reaction.
1903.	February	2.	0.8 c.c. " to 105.2° F.
"	"	9.	1.0 c.c. " to 103.0° F.
"	"	15.	1.5 c.c. " to 104.4° F.

1903.	February	18.	0.0013 grm. human tubercle bacilli, intravenously.		
"	"	22.	1.0 c.c. tuberculin ;	reaction	to 103.2° F.
"	"	24.	1.5 c.c.	"	" to 104.0° F.
"	March	4.	2.0 c.c.	"	" to 105.6° F.
"	"	6.	2.5 c.c.	"	" to 103.8° F.
"	"	11.	3.0 c.c.	"	" to 103.2° F.
"	"	14.	3.5 c.c.	"	" to 104.0° F.
"	"	21.	0.0039 grm. human tubercle bacilli, intravenously.		
"	"	27.	1.0 c.c. tuberculin ;	reaction	to 103.4° F.
"	"	29.	1.5 c.c.	"	" to 102.8° F.
"	April	5.	2.0 c.c.	"	" to 102.6° F.
"	"	8.	2.5 c.c.	"	" to 102.8° F.
"	"	10.	3.0 c.c.	"	" to 103.2° F.
"	"	16.	3.5 c.c.	"	" to 103.4° F.
"	"	18.	0.0039 grm. human tubercle bacilli, intravenously.		
"	"	23.	0.5 c.c. tuberculin ;	reaction	to 103.6° F.
"	"	27.	1.0 c.c.	"	" to 102.2° F.
"	"	30.	2.0 c.c.	"	" to 104.2° F.
1904.	March.	29.	0.0065 grm. human tubercle bacilli, intravenously.		
"	April	1.	1.0 c.c. tuberculin ;	reaction	to 103.0° F.
"	"	4.	2.0 c.c.	"	" to 103.3° F.
"	"	8.	3.0 c.c.	"	" to 103.8° F.
"	"	11.	4.0 c.c.	"	" to 103.1° F.
"	"	15.	5.0 c.c.	"	" to 102.2° F.
"	"	30.	Killed.		

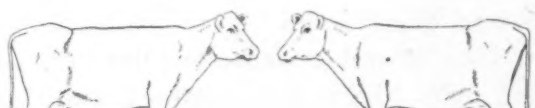

FIG. 6.

Left bronchial gland.

Necropsy.—Weight 421 pounds; unthrifty condition. The only distinct evidence of tuberculosis in this animal is a calcareous nodule the size of a pea in the left bronchial gland. The pleura and peritoneum were more or less opaque and showed films or flakes of fibrin partly or wholly organized and in some places evidently of considerable age. Guinea-pigs inoculated from the calcareous nodule in the bronchial gland became tuberculous.

It is evident that this animal had suffered with a widespread inflammation of the serous membranes from which it had practically recovered. Such a diffuse inflammation of the serous membranes of both visceral cavities occurs in tuberculosis of cattle of the type of pearl disease. But in this case there were no tubercles or evidence of tuberculosis. One must consider the possibility that in this animal there was a healed, fresh tuberculosis of the pleura and peritoneum.

THIRD GROUP.—*Six calves which received no treatment and were kept as controls for the purpose of comparison.*

FIG. 7.—*Red-and-white Bull* (16,014).

1902. December 19. 0.1 c.c. tuberculin; reaction.
1903. February 2. 0.8 c.c. " " to 105.6° F
" May 4. Died.

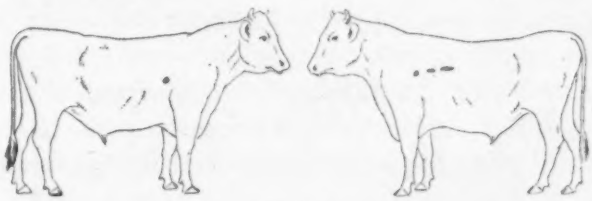

FIG. 7.

Right bronchial gland. Left bronchial gland. Mediastinal glands.

Necropsy.—Weight 430 pounds. This bull died suddenly, apparently of acute indigestion. The only evidence of tuberculosis in this animal consisted in the presence of several caseous nodules in both bronchial and in the mediastinal lymphatic glands.

FIG. 8.—*Red-and-white Heifer* (16,016).

1902. December 19. 0.1 c.c. tuberculin; reaction.
1903. February 2. 0.8 c.c. " " to 106.0° F.
1904. September 17. Killed.

FIG. 8.

Left lung. Mediastinal gland.

Necropsy.—Weight 578 pounds; poor condition. In the left lung at the bottom of the posterior lobe there is an area containing numerous tubercles, some of which have undergone caseation. Two similar areas are found in the tip of the lung. The surrounding lung tissue is red and dense and is infiltrated with small gray tubercles of pinhead size, some of which have cheesy centres. The posterior mediastinal gland is five inches long and two inches in diameter. This gland is filled with dense nodules, most of which have undergone caseation, and some of which contain calcareous deposits. Guinea-pigs inoculated with infiltrated lung tissue developed tuberculosis.

FIG. 9.—*Red-and-white Heifer* (16,018).

1902. December 19. 0.1 c.c. tuberculin; reaction.
1903. February 2. 0.8 c.c. " " to 106.4° F.
1904. September 19. Killed.

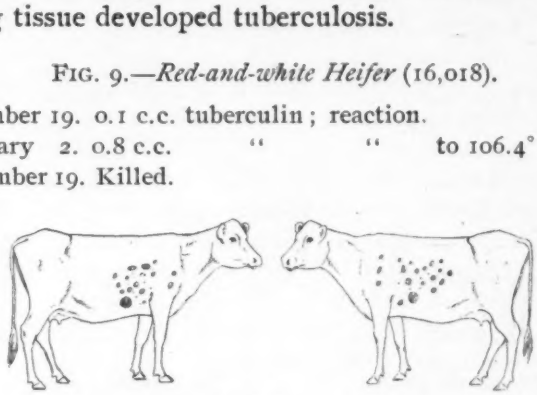

FIG. 9.

Right lung. Left lung.
Bronchial glands.
Mediastinal glands.

Necropsy.—Weight 415 pounds; poor condition. Both the anterior and middle lobes of the right lung are attached to the chest wall; the anterior lobe is also attached to the pericardium. There are numerous tuberculous areas of all ages and up to one and a half inches in diameter scattered rather thickly through both lungs. Both bronchial and the mediastinal glands are enlarged and contain numerous caseous and caseocalcareous nodules.

FIG. 10.—*Red-and-white Bull* (16,020).

1902. December 19. 0.1 c.c. tuberculin; reaction.
1903. February 2. 0.8 c.c. " " to 105° F
1904. September 13. Died.

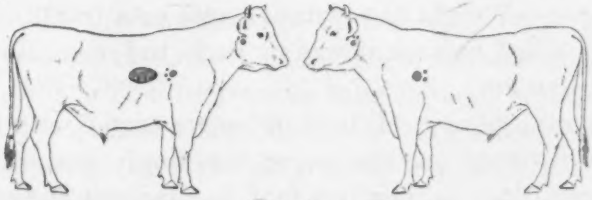

FIG. 10.

Bronchial glands.
Mediastinal glands.
Postpharyngeal glands.

Postpharyngeal glands.
Bronchial glands.

Necropsy.—Weight 480 pounds; fair condition. This bull was apparently quite healthy on the 12th of September, and was found dead in the stable the next day. It was found that there was a great collection of gas in the paunch and this appears to have been the cause of death, through interference with respiration by pressure upon the diaphragm. The evidence of tuberculosis in this animal consisted in the presence of several caseous nodules in both bronchial glands; the posterior mediastinal gland is six inches long and quite thick. The entire structure of this gland has undergone degeneration. Both postpharyngeal lymphatic glands are slightly enlarged and contain caseous areas.

It is quite possible that in this case the enlarged mediastinal lymphatic gland was a contributing cause of death through pressing upon the œsophagus and tending to interfere with the regurgitation of gas.

FIG. 11.—*Red-and-white Heifer* (16,023).

1902. December 19. 0.1 c.c. tuberculin; reaction.
1903. February 2. 0.8 c.c. " " to 106.4° F.
1904. April 30. Killed.

FIG. 11.

Postpharyngeal gland.
Right lung.
Right pleura.
Bronchial glands.

Mediastinal glands.
Omentum.
Spleen.
Liver.

Left lung, etc.

Necropsy.—Weight 313 pounds; very poor condition. This heifer was killed because it was in such bad condition that it could not live long.

The costal pleuræ of both sides are coated with masses of round and flattened nodules occurring singly and in patches. The largest patch is nearly a foot in diameter and about two inches thick. Both lungs are covered with round and flattened nodules, some of which are closely attached to the pleura and some of which hang from the pleura singly and in clusters. There is a fringe around the borders of the lungs about two inches wide and very thickly studded with hard nodules, the centres of which have undergone caseation. Both lungs contain a large number of caseous areas. The bronchial and mediastinal lymphatic glands are considerably enlarged and caseous. The post-pharyngeal glands are in similar condition. The omentum, the walls of the stomachs, the abdominal walls, the spleen and liver are coated with nodular masses that are characteristic of pearl disease. There are numerous caseous areas in the substance of the liver. The bronchial lymphatic glands are enlarged to several times their natural size and are caseous.

This a case of "pearl disease" in the most advanced form and of widest distribution.

FIG. 12.—*Red-and-white Bull* (16,024).

1902. December 19. 0,1 c.c. tuberculin; reaction.
1903. February 2. 0.8 c.c. " " to 106° F.
1904. September 17. Killed.

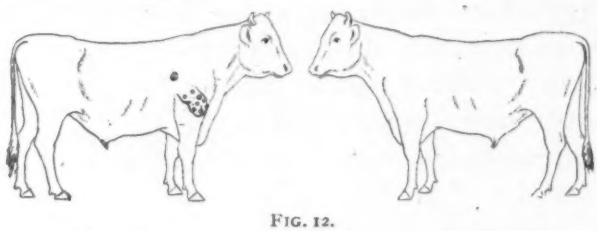

FIG. 12.

Right lung.
Right bronchial gland.

Necropsy.—Weight 524 pounds; good condition. The right bronchial gland is somewhat enlarged and contains a calcareous

nodule. In the anterior lobe of the right lung there are numerous nodules containing pus. These are surrounded by firm, fibrous walls. The intervening lung tissue is collapsed.

The observations here recorded show a decided difference between the lot of six young cattle that were treated and the six that were not treated. Since the two lots of animals were in all respects as nearly equal as possible at the beginning of the experiment, and since they were cared for all together and in precisely the same way, excepting in respect to specific treatment, it is but fair to conclude that the six treated animals were favorably influenced by the treatment.

We believe that we have sufficient evidence to justifiy the statement that the treatment to which six of the animals were subjected had the effect not only of keeping in check the progress of the tuberculous process, but in causing a distinct and in some cases (Nos. 2, 3, and 6) a great retrogression of the lesions. In other words, the treatment had a distinct curative effect.

In all of the treated animals the lesions were quiescent and encapsulated. But they contained living tubercle bacilli. There is room for difference of opinion as to whether an animal or a person in which there is a tuberculous lesion containing living bacilli may be regarded as cured. If the lesion is wholly cut off by a thick fibrous wall from living tissue and if it is incapable of again becoming active, it would appear that a claim for a cure might fairly be entered. But how is one to know that activity may not be re-established? If there is resistance enough to cause the complete encapsulation of all tuberculous lesions in the body, it is evidence that a considerable degree of immunity had been developed. If the bacilli in the lesions are of such low virulence that they cannot infect an animal of the species of the one in which they are found, renewed activity is not to be expected. De Schweinitz found living tubercle bacilli in minute nodules in the lungs of a cow inoculated intravenously a year before with bacilli of human type that appear to have been incapable of producing progressive disease. Nodules

may occur from intravenous injections of dead tubercle bacilli. Fraenkel and von Behring have found in lesions of tuberculosis of cattle tubercle bacilli that are not pathogenic for cattle.

Unfortunately, in these experiments, the virulence for cattle of the tubercle bacilli in the lesions in the treated animals was not determined.

These experiments which were made on a few young cattle in the earlier stage of tuberculosis do not justify conclusions or inferences as to the probable effect of similar treatment on older and more extensively diseased animals. Experiments must be made on a larger and broader scale. We have at this time a number of animals under treatment which we hope will give us more knowledge on this subject.

But we hold that the experiments that have been made show clearly that under such treatment as was given tuberculous lesions do not extend; on the contrary, that they recede and that new implantations do not occur even upon prolonged contact with tuberculous herd mates.

TENNESSEE'S NEW EXAMINING BOARD.—Governor John I. Cox, of Tennessee, has appointed the following veterinarians to constitute the State Board of Veterinary Medical Examiners: Drs. Geo. R. White, Nashville; J. W. Scheibler, Memphis; M. Jacob, Knoxville; Geo. B. Blackman, Chattanooga.

A STATEMENT in the daily press has it that in the city of Boston, Mass., there were reported during the twelve months ending January 31 last, 327 "suspicious" cases of glanders, of which 246 were found to be glanders. During the previous year 253 "suspicious" cases were reported and 188 cases were found actually to exist.

THE REPUBLIC OF CUBA has started out, through its Agricultural Department, to investigate the diseases of the horse common on the island. Circular No. 12 from the Central Agricultural Station at Santiago de las Vegas deals with mange and bots. The frontispiece showing an old white plug horse suffering from mange in an advanced stage is very lifelike. Dr. N. S. Mayo is in charge of the Department of Animal Industry in Cuba.

THE BENEFIT OF CHANGING THE CONSTITUENTS OF THE BLOOD IN CERTAIN DISEASES BY INTRAVENOUS INJECTIONS.

By Dr. G. W. Dunphy, Lansing, Mich.

Read before the Annual Meeting of the Michigan State V. M. A., at Lansing, February 7, 1905.

Mr. President and Gentlemen :

In bringing this matter before you it is only with the idea that a field is opened for experimentation along certain lines, from which I believe good results can be obtained in the treatment of those diseases where the blood is charged with toxins or where the bacteria of certain diseases are carried to a considerable extent in the circulation. Reports from veterinarians in many different parts of the country indicate that good results are obtained from intravenous injections of saline solution in various amounts, from two litres in some cases to six in others.

Let us consider for a moment how these results are obtained. In the first place, in many febrile diseases water is badly needed in the tissues; in the second place, advantages are gained by dilution of the toxins and again by the increase of elimination. A special effect of loss of water in the tissues under pathologic conditions is the irritability of the nerve centres which naturally wear out the vitality of the animal. Another important factor in this method of treatment is the fact that saline solution may in this way be made a means of conveying oxygen to the blood directly as well as stimulating the action of the heart in cases where the circulation is weakened. There is little doubt in my own mind in regard to the chance of a change in the constituents of the blood preventing the toleration and probable increase of ptomains and other toxic elements in the circulation.

We know that certain bacteria grow and flourish in a media of a particular kind, while the least change in the media will either retard the growth to a great extent or prevent any growth whatever. This being the case, may we not reasonably assume that beneficial results may be obtained from changing the con-

dition of the blood? In order to make a change of sufficient importance to dilute the toxin, it would seem to be necessary to draw a portion of the blood from the animal to avoid congestion of the circulatory organs by adding to the volume of fluid carried by the bloodvessels throughout the circulation. By withdrawing from four to six litres of blood from the circulation, you not only avoid any congestion of the heart and bloodvessels, but remove much deleterious matter that may be circulating in the blood, and, by injecting the same quantity of normal saline solution, we have a chance of changing the constituents of the blood, of diluting the toxin if such is present, and changing the media in which the bacteria are produced if any such condition exists. I might mention here a few experiments that we have tried in my practice along these lines.

On Sept. 25th, 1904, horse, which we will designate as No. 1, showed well-marked symptoms of purpura following an attack of influenza. My attention was called to the animal after the symptoms were fairly well marked. The usual abrupt swelling of the limbs had taken place, and the temperature had risen about 104° to 105° F. We decided to try the intravenous injection of normal salt solution, but concluded to first take a reasonable amount of blood, consequently we introduced a trocar and canula into the jugular vein, and, after drawing off about five litres of blood, injected six litres of normal salt solution at a temperature of about 100° F. The temperature remained about stationary for the next four hours, after which there was a gradual decline until it reached 102°—a drop of 2.5° in eighteen hours. We repeated the injection in twenty-four hours, removing about two litres of blood and injecting three litres of saline solution. Mild tonics of nux vomica, iron and quinine were given and rapid recovery ensued.

Horse No. 2 showed well-marked symptoms of purpura on the morning of Nov. 4th, 1904, these symptoms having developed quickly, the temperature rising from 101° to 105° during the night. This horse received the same treatment, making a certain and speedy recovery.

These two experiments cannot be considered as convincing evidence that this line of treatment will prove valuable in general practice, but I feel that there is at least a field for experimentation here that shows a possibility of good results.

To illustrate the restorative value of saline solution, we made an experiment on a case, of which I will give a brief report. The subject, a small bay mare weighing about 900 lbs., in good health and fair condition, was bled on September 12th—6 litres; on the 13th the same quantity was withdrawn, and on the 14th thirteen litres were taken. The animal had reached the point where no more blood would flow through the canula from the jugular vein, was lying down in a comatose condition, the eyes perfectly amaurotic and insensible to light and touch; pulse imperceptible and all conditions pointing to a speedy death. We then reversed the direction of the canula, and proceeded to inject normal saline solution, gradually pumping the fluid into the vein until we had given six litres. In twenty minutes after the injection the animal began to show signs of recovery; the pulsation in the submaxillary artery being perceptible to the touch and the breathing more regular. In thirty minutes from the time of injection she had raised her head and rolled up on the sternum. In one hour from the time of operation she had risen to her feet and walked a distance of 300 feet to her stall. She gradually gained strength and appetite until at the end of a week she was in normal condition.

I merely mention this case to show the apparent restorative power of the saline solution, and to emphasize the fact that there is little danger to be feared from withdrawing a limited amount of blood before making the injection, as it removes any danger of congesting the circulation, and no doubt carries away a considerable amount of deleterious matter, which must naturally accumulate in the blood as the waste material from tissue metamorphosis are not readily carried from the system, owing to the inactivity of the excretory organs in many of these cases.

I do not wish it understood that I feel warranted in drawing a definite conclusion in regard to this line of treatment, but my

experiments have been sufficiently encouraging to suggest to my fellow practitioners the advisability of trying out this method of treatment. I hope to be able to carry on these experiments to a greater extent, and trust that I may have the pleasure of comparing notes with some of my brother practitioners who are present this evening, and that our experiments along these lines may be of mutual benefit.

NEWS comes from El Reno, Okla., of the summary destruction of a jack found by the officials to be suffering from maladie du coit. It is stated that this one was the third jack to be ordered destroyed for the same reason this year.

THE New York State Legislature has voted down a bill to prohibit docking, or the importation of docked horses, except for temporary exhibition purposes. The *Horse World* denounces the practice of docking horses' tails as barbarous, and says it exists only by the support of the fashionable and wealthy classes.

OUR genial friend, Dr. W. T. Monsarrat, of Honolulu, H. T., is without question the most versatile veterinarian that we know of. Besides doing regular practice, occupying every official veterinary position in the city of Honolulu and territory of Hawaii, a recent copy of the *Pacific Commercial Advertiser* prints the photo of his pleasing face in the rôle and garb of captain of the Punahou Base Ball Club.

TUBERCULOSIS IN THE DAIRY HERDS OF MASSACHUSETTS.—The State Board of Health has just completed its inspection of the milk farms in Acton, Shirley, Carlisle, Billerica, Bedford, Harvard, Maynard, Westford, Concord and Chelmsford. Out of the 414 milk farms inspected in these small towns no less than 307 are under the ban. The proprietors have been told that they must carry out the board's orders if any more milk is to be sold from these places. On these 414 milk farms no less than 100 diseased cattle have been found. In many of the cases the cows are so far gone that they had to be killed at once, for the protection of the community. The showing is so appalling that some of the health officials are staggered. Only a reckless disregard of the public health could induce milk producers to allow such unhealthy and dangerous conditions. The farmers near the border, across in New Hampshire, are already frightened by the raids. They insist that they will not allow an exposure of their practices.—(*Boston Advertiser, May 5.*)

SOME PROBLEMS RELATING TO THE VALUE OF IN-AND-OUT BREEDING.

By W. R. Cooper, D. V. M., Kansas City, Mo.

Read before the Missouri Valley Veterinary Association, Jan. 11-12, 1905.

The question of the practicability of mating closely related individuals or the opposite, has confronted the breeder and student of heredity for centuries, and will continue to be a problem for the succeeding centuries.

That in many instances, phenomenal animals have been produced from closely related parents, is admitted by all students. It is also an admitted fact that many phenomenal animals appear whose parents are very remotely related, or of no traceable relationship. The latter where the pedigree can be traced for eight generations are extremely rare. Of the examples of incestuous breeding the English setter bitch Countess is a remarkable example. Her paternal grandsire, Sting, being the product of four generations of full brothers and sisters mating without an out-cross. Her paternal grandam being produced by two generations of full brothers and sisters names appearing in the pedigree of Sting, her grandsire; in fact Dash I and Belle I are names appearing 42 times, and in no instance more than six generations away. In other words, there is no other name in the pedigree of Countess except as descendants of those two dogs. Stonehenge says "She was an extraordinary animal, both in appearance and at work, a prominent winner in the field trials of England in her time. Her faults were being unsteady when fresh and too keen for her work, but her pace was phenomenal."

A study of the pedigree of most classes of live stock shows a remarkable recurrence of familiar names of famous individuals in the pedigree of every exceptional animal, thus showing relationship in parentage.

A study of the natural habits of all gregarious animals show that incestuous breeding is very common among them. Taking the horse as an example, a vigorous and fleet stallion may

retain his band of mares for several years or perhaps until he is fifteen or more years of age; driving out all the colts and retaining the fillies, also perhaps capturing a few strange mares; he will have been practicing incestuous breeding on the younger mares of the band, *i. e.*, his daughters and granddaughters. By that time his infirmities will probably cause his defeat by a younger and more vigorous stallion, perhaps his own son. This will relieve the incestuous breeding with a strong out-cross and arrest the tendency to deterioration, but retain the intensity of blood caused by the inbreeding. Almost a parallel example of this kind is the mating of Betty Leeds and the Darley Arabian who produced Bartlett's Childers, brother to Flying Childers, the most remarkable racer produced in England up to his time, also a remarkable prepotent sire. Betty Leeds, sire Careless, was by Spanker. Her grandam was by Spanker, out of Spanker's own dam. The sister to Old Country Wench, by Lister's Snake, whose dam was by Hautboy, had as a dam a daughter of Hautboy, whose dam was by Hautboy. Here Hautboy bred to one of his own fillies, produced a filly, which bred to a son of one of his fillies, produced the dam of Squirt, by Childers (above mentioned). Squirt was the grandsire of Eclipse. It would seem that with the incestuously bred Betty Leeds as a grandam and the sister to Old Country Wench as a dam, that Squirt was incestuously enough bred. The dam of Marske, sire of Eclipse, was a daughter of Hutton's Blacklegs whose dam was by Coneyskins, by Lister's Turk, sire of Lister's Snake. (See above.) Coneyskin's dam was a daughter of Jig, by The Byerly Turk. Jig's dam was by Spanker. (See above.) Hutton's Blackleg's dam was a maternal granddaughter of Hautboy. The Blackleg mare's dam was by a grandson of Hautboy, and out of Betty Leeds, dam (above), whose dam also was by Coneyskins (above), out of a great granddaughter of Byerly Turk. Such was the inbreeding of Marske, the sire of Eclipse. Spiletta, the dam of Eclipse, was by Regulus, by Godolphin's Barb. Regulus's grandam was Squirt's dam, sister to Old Country Wench (above).

Spiletta has Hautboy only 5 removes away in her sire's pedigree and 4 removes away in her dam's pedigree.

The dam and both grandams of Old Country Wench were by Hautboy; *i. e.*, Hautboy appeared once at 2 removes and twice at 3 removes from Old Country Wench.

Old Country Wench was 3 removes from Eclipse in his sire line and 4 removes away in his dam line. Sister to Leeds, whose dam was by Spanker, bred to his own dam, is 5 removes away from his grandsire Squirt and 6 removes through his sire's (Marske's) dam, and Hautboy also appearing 4 times in other strains than by Old Country Wench at—once 5 removes, twice at 6 removes, and once at 7 removes, while Spanker only appears thrice in other lines than Sister to Leeds; once at 6 removes through his son bred to Sister to Leeds, and once at 9 removes, and once at 11 removes. It would appear that Hautboy exerted a much stronger influence on Eclipse than did Spanker, to credit Eclipse's greatness to Darley Arabian, when he only carried 16.256 of the blood of Darley, while he carried 9.256 of the blood of Spanker intensified by incestuous breeding in Betty Leeds, once on the Sister to Leeds, twice and 31.256 of the blood of Hautboy, twice through the incestuously bred Old Country Wench, lacking but 1.256 of carrying twice as much as Hautboy or Darley and through the incestuously bred O. W. C. at lesser removes than Darley, indicates that Eclipse is more Hautboy than Darley Arabian, and from cuts or engravings Eclipse resembles Hautboy in size and muscular development more than in the light fine form of the imported Arabian, being larger, heavier bodied and much stronger made than the typical Arabian of which Darley was an example.

Such was the inbreeding of Eclipse. The question then arises what manner of horse as a race horse, individual, and sire was Eclipse?

The name Eclipse was and is considered as the most masculine in type, probably second to Gladiateur as a racer, but as a sire the most prominent name in the English stud book and is gradually driving all other names of its time to the wall. Horses

strongly inbred to Eclipse through his strongest lines have always been great sires. He was a direct male descendant of the Darley Arabian, the greatest of all the oriental importations as a male line or sire producing strain.

It must be remembered that all stock is divided into male, or sire lines; and female, dam or running lines, and that because an animal is a male does not necessarily signify that he will be of a masculine type or that a female must be effeminate in type, it often being the reverse, hence such effeminate males will not produce strong males unless mated to very masculine females in type. This condition is often very noticeable in the human species.

The English runner or thoroughbred is a very good animal to study as an example of the effect of in-and-out breeding, originating during the reign of Charles and James II by importation of Arab, Turkish and Barbary horses, including 100 mares and 25 stallions. There are at present represented but about 42 mares and 10 or 12 stallions in the record of the classic winners, of which 9 mares and 3 stallions are considered necessary in a pedigree to get a winner. Out of the mares represented as classic winners, *i. e.*, whose blood was the strongest in the individual, Tregonwell's Natural Barb mare stands first with 75 classic winners, 14 Derbies, 16 Oaks, 12 St. Ledgers and 33 times in the 1000 or 2000 Guineas.

Burton's Barb mare is second with 59 classic races to the credit of her descendants; 9 Derbies, 16 Oaks, 19 St. Ledgers, 15 times in 1000 and 2000 Guineas.

The dam of the Two True Blues is third with 61 classic winners; 15 Derbies, 14 Oaks, 13 St. Ledgers, and 19 1000 and 2000 Guineas.

The three families above named have almost as many classic winners to their credit as all the rest of the 42 found as classic winners.

The first 5 in the list are classed as dam, or running lines, *i. e.*, produce great sprinters or great brood mares, with the exception of No. 3, which is regarded as equally good as male or

female producing lines and is probably the most useful of all the families in the stud book.

The male lines stand out relatively as Nos. 3, 8, 11, 12 and 14 in the record of classic wins and needs to be crossed on the first 5 of the list to produce phenomenal results, especially if the first 5 lines or any part of them have been closely inbred to each other. The other line which will allow inbreeding to itself alone is the line responsible for Eclipse of No. 12, and his best produce were from the first 5 lines mentioned. These numbers refer to mares who were either feminine or masculine in their type.

Of the stallions regarded as indispensable at the present time are Darley Arabian, a strong masculine or sire line to which Eclipse belongs. The Byerly Turk and Godolphin's Barb, both prominent as dam lines or more effeminate than Darley Arabian. They were imported, Byerly Turk 1690, Darley Arabian 1700, and Godolphin's Barb 1704, Eclipse was foaled 1764. The Byerly Turk traces to the present time through Herod as a producing line. Herod was foaled 1758. The Godolphin's Barb was perpetuated by Matchem, foaled 1748.

Herod was a great grandson of Byerly Turk. His dam was by grandson of Darley Arabian through Bartlett's Childers, great grandsire of Eclipse, carrying nearly the same crosses of Hautboy that Eclipse had, through his paternal grandam.

Matchem was a grandson of Godolphin's Barb. His paternal grandam was a granddaughter of the dam of Betty Leeds (Childers' dam). His dam was a great granddaughter of Byerly Turk and a mare by Spanker. Other lines were strongly bred in the 5 running or female lines.

A close study of the blood of the three named horses, Eclipse, Herod and Matchem, the three names that dominated the pedigree of the winners of the English turf of their time and whose blood is still potent, shows, in each of the three, the Sister to Leeds or her daughter Betty Leeds, the incestuously bred Spanker mare, while Eclipse gets the sister to Old Country Wench, a remarkably masculine strain on both sides of his ped-

igree, by his sire at the third remove, and his dam at the fourth, also Clumsy, brother to the grandam of Old Country Wench through his sire.

By a short study of the pedigree of Stockwell, the most successful sire of modern times and considered a necessity in a first class pedigree at the present time, one finds that he traces 14 times to Eclipse, within 7 removes, through Whalebone and Whisker, brothers, and their sister Web; descending through Sir Hercules, Bird Catcher and Glencoe, backed up by Wanderer; inbred to the 3, Eclipse, Herod and Matchem and the No. 3 family or dam of the Two True Blues.

Isonomy, dam by Stockwell, another phenomenal sire of masculine type, has Bird Catcher at 3 and 4 removes. His (Bird Catcher's) sire, Sir Hercules, 4 times at 4 and 5 removes.

Salvator is a great grandson of Stockwell, both of which trace strongly to Eclipse, whom Salvator resembles very much.

A short study of the origin of the American trotting horse reveals very similar conditions and results. Beginning with Messenger, foaled 1780, imported here about 1788, a direct descendant in the male line from the Darley Arabian through Childers, whose exploits sound even fabulous at the present time, whose (Childers') dam was the incestuously bred Betty Leeds. Godolphins' Barb appears in Messenger's pedigree 3 times through Matchem, and Regulus, sire of dam of Eclipse. Messenger was a thoroughbred, a descendant of a line of the best winners on the English turf. He sired the dam of Am. Eclipse, the most successful racer of his day. His strongest lines were those that were capable of learning to trot or to make good roadsters. Abdallah, through his son Mambrino; and Mambrino Chief, by Mambrino Paymaster, by Mambrino.

A question has arisen concerning Sampson, the great grandsire of Messenger, he being a black, very large and coarse. Though able to beat all the crack racers of his day, no black horse of that style could be traced in his pedigree, which has led many to believe that Sampson was sired by a coach horse. The coarse build has descended through Messenger and through

Abdallah, whose dam was undoubtedly by a son or grandson of Messenger, Abdallah being a blood bay with coarse head, ears, and lips, a rat tail and a very positive disposition. His feet and legs were remarkably fine and strong and his gait at the trot very reaching and enduring. His best sons, *i. e.* (Hambletonian's) dam was by old Bellfounder, a Norfolk trotter. The dam known as the Chas. Kent mare was a daughter of Old One Eye, whose dam was Old Silver Tail, by a son of Messenger. One Eye was sired by Bishop's Hambletonian, inbred son of Messenger. Most of the above Messenger's descendants had a reputation of being of bad temper but remarkably enduring as roadsters, Old Silver Tail frequently carrying her owner, Mr. John Seely, of Orange Co., to Albany, 100 miles, in a day under saddle and once carried the owner and son, a lad of 10 years, home from New York, 75 miles, in a day. Such was the inbred maternal line of Hambletonian, son of Abdallah. At the present time Hambletonian blood is the controlling male line of about 95 per cent. of the 2.30 trotters. He sired over 1300 colts, many of which were kept for service, and it is said never sired a sorrel or chestnut colt. Of his sons, about 4 are considered necessarily the predominating element in a high-class pedigree. His best crosses have been with Mambrino Chief mares or descendants through Mambrino Patchen and Henry Clay mares. Hambletonian lines will not bear inbreeding upon themselves. Other lines which mix well with Hambletonian are American Star with Messenger on the dam's side; Clays and Patchens, Messenger on the dam's side; Royal George lines, also a Messenger, Bashaw's, Messenger on dam's side; Ethan Allen, Messenger on dam's side; all of which ancestral blood did not trot until Messenger blood became a part of the pedigree. The combination of blood found in American trotters indicates that Messenger blood would bear strong and even incestuous inbreeding to itself provided it came through Abdallah as a sire line or Mambrino as a dam line, backed up by the minor strains previously mentioned. Many of the strains I have mentioned are not authentically or abso-

lutely proven, but the measurements and other characteristics stamp the individuals so unmistakably that there is very little doubt, and in each instance descendants of Messenger stood for service at the time and place the colts were foaled, while in some instances where the pedigree is officially credited characteristics indicate conditions otherwise. As of Sampson, the question has arisen regarding the sire of Mambrino Patchen in a similar manner. Mambrino Chief, his recorded sire, and Gaines' Denmark were both in the same stable when the dam of Mambrino Patchen was sent for service, her former foal (by Mambrino Chief), Lady Thorn, was a bay not like Mambrino Patchen in any particular, who was black. Mambrino Chief had never sired a black colt until then. Gaines' Denmark was black and Mambrino Patchen was black and in form and gait resembled Gaines' Denmark much more than he did Mambrino Chief. Gaines' Denmark was a favorite of the colored groom, Mambrino Chief was not. The paternity of Mambrino Patchen has thus been raised by one of Kentucky's most prominent breeders recently.

The history of turf performances and pedigrees indicate that all horses are somewhat inbred, some incestuously, others remotely, but that the inbreeding must be from two to four or five removes away to cause the best results and should be on the dam's side with a cross of the same blood in the dam of the sire to nick well in the offspring, or if the dam being of a strong masculine strain and the sire of a feminine strain the opposite, or, in short, outbred sires to inbred dams, and that but approximately, two horses or families in the turf history will stand incestuous inbreeding to themselves and not suffer from weakened constitution as sires or become effeminate, viz.: English Eclipse and Messenger, both direct male descendants of Darley Arabian and both intensely masculine and vigorous, even their daughters having a masculine disposition. Eclipse, the greatest name in the English stud book; Messenger, the greatest horse from point of value to the public ever landed on American soil. An anecdote of Messenger which records that when imported with

three others, all of which had to be supported from the ship to the dock on account of exhaustion incident to a rough voyage, Messenger raced down the gang plank with a groom on each side who were unable to check him until he had run nearly a quarter of a mile, is sufficient indication of his vigor and courage.

DR. J. R. MITCHELL, Evansville, Ind., recommends the swinging stall partition to cure horses of kicking in the stable.

DR. WILLIAM DIMOND, of Newark, N. J., at one time an Inspector of the Bureau of Animal Industry, is now warden of the Essex County Prison at Newark.

A RECENT LAW of Pennsylvania is that requiring veterinary surgeons to report all cases of contagious diseases in animals to the State Live Stock Sanitary Board.

AT the annual meeting of the Colorado Kennel Club, held May 6th, Dr. Mark White, Jr. (U. P., '04), of Denver, was elected to act as veterinarian at the coming dog show.

ONE of the handsomest publications which comes to the REVIEW office is the *Quarterly Bulletin of the San Francisco Veterinary College*, the number for March being a fine example of high art in printing.

BESIDES his many duties in his profession Dr. T. Earle Budd, of Orange, N. J., finds time to give attention to the important duties of a member of the Board of Education of his city. Dr. John B. Hopper serves the public in a similar capacity at Ridgewood, N. J.

THE report of the Government Entomologist of the Cape of Good Hope, for the half-year ended June 30, 1904, is a very neat document containing much valuable information concerning the African diseases of live stock. We have also received some special reports from the same source, of interest to veterinarians.

EXAMINATION FOR LICENSE TO PRACTICE IN NEW JERSEY.—The New Jersey State Board of Veterinary Medical Examiners will meet at the State House, Trenton, N. J., June 27th and 28th for the examination of veterinarians for license to practice veterinary medicine, surgery and dentistry in that State. Applications may now be made to President William Herbert Lowe in writing and mailed to the office of the Board, 169 Paterson Street, Paterson, N. J.

REPORTS OF CASES.

"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations, he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."

STRONGYLUS PARADOXUS OR LUNG WORM IN SWINE.*

By J. HARVEY SLATER, V. S., Richmond, Mo.

September 6th, 1904, I was called to see a herd of sick hogs (Chester White). The owner stated that the neighbors had lost nearly all their hogs from apparently the same disease and supposed it was cholera. Mr. Barker (my client), being a close observer, thought it different from any case of cholera he had ever seen; therefore he called me to investigate the malady.

The following symptoms were evident: spasmodic cough, after a few days' refusal of food, elevation of temperature, dyspnœa, anæmia, animal gaunt very suddenly, great weakness especially of hind parts, frequent discolorization of the skin, especially of the ears and over the ventral surface.

Post-mortem examination revealed pneumonia due to the presence of a worm in the lungs, which proved to be *Strongylus paradoxus*. I sent a sample of these worms to Dr. B. F. Kaupp, of Kansas City, who is recognized as authority on parasitology. He verified my diagnosis.

I shall quote freely from Mehlis, Law, and others in giving a description of this little ravager which bears so pretentious a name. It is a delicate filiform worm, white or brownish. Mouth terminal, round, with six papillæ. Male ½ to ¾ inch; female 1 to 1¼ inch long; caudal bursa of male deeply bilobed, each lobe supported by five rays. Two long, delicate spicula. Tail of female curved with sharp point; vulva on a pre-oval tubercle. Oviparous or ovoviviparous. Ova elliptical with contained embryo folded several times.

In fatal cases of young pigs I found balls of worms coated with mucus and pus in the bronchia; in older ones they are found in the air sacules. The development of the parasite has not been traced but is probably similar to that of the *Strongylus filaria* and is favored by similar local conditions, allowance being made for the fact that the ravages of the worm are confined to swine only.

Symptoms are often obscure; unthriftiness, lack of condi-

* Read before the Missouri Valley Veterinary Association, Jan. 11-12, 1905.

tion, anæmia and emaciation are shown especially in young pigs and if associated with a paroxysmal cough—hard at first and later moist and rattling or even suffocating—and if this shows in a large proportion of the herd independently of any change of weather, damp bed, or other cause, there is a strong presumption of lung worms. This worm was found more than a hundred years ago in different parts of Southern Europe. In the beginning of the nineteenth century Bellingham and others found it in the abattoirs of Paris and Dublin. Law has frequently found them in unthrifty pigs and shoats in Central New York. However, it is rare in this section of the country. Several authors claim that in the majority of cases the disease subsides and the patient recovers so that its true nature is never discovered. Death may be from suffocation or from progressive emaciation or marasmus. The lesions are essentially the same as those of verminous bronchitis in sheep, a number of parasites determining the extent and violence of the morbid process.

In the outbreak I have chronicled here the disease proved fatal to 80 per cent. of the herd. Duration being from a few days to four or five weeks. Among the farmers and fancy hog breeders in the vicinity of my client the average loss in each herd was about 85 per cent. If no one in the infected neighborhood had consulted a veterinarian the heavy loss sustained would have been attributed to cholera, and the real mischief-maker, *Strongylus paradoxus*, would thus have escaped suspicion.

I recommended dipping, change of pig pen and range, also careful avoidance of pond, running or well water which might have become contaminated by the affected herd; or better still to boil all water before it was supplied to the hogs. Such measures are very necessary in the case of young pigs, which almost always furnish fatal cases; or if the sows are affected the food should be moderately salted and the pigs should be removed from the sow and all mature swine as soon as they are weaned. After taking precautionary measures to prevent the spread of the disease to the unaffected herd I turned my attention to the sick hogs. I was ambitious to save them if possible. Black recommends intratracheal injections of benzine or oil turpentine. Owing to the inaccessibility of the trachea in the pig I administered oil turpentine and oil eucalyptus by inhalation. I secured a pig by means of a crate and over its head I slipped a noose-bag which was connected by means of a rubber hose with a large tin vessel shaped like an inverted funnel.

The vessel was filled with medicated water and placed upon a gasoline stove. Each pig was steamed five minutes, then dipped and turned into an orchard 150 yards from the regular feed lot. The steaming was continued four consecutive days, but the method was unsatisfactory for the reason that too much time was consumed in medicating a large herd, and, besides, it seemed necessary to put more medicine in the steaming can each time after steaming a pig, as the first pig seemed to get the benefit of all the medicine. There is no doubt but that this treatment was beneficial, as far as it was carried. We lacked proper apparatus to carry out treatment as I wished, thus I can report only partial success. With suitable facilities the steaming process undoubtedly would be entirely satisfactory.

[An interesting discussion followed, which was participated in by Drs. Brown, Goode, Kaupp, Norton and Stewart. Dr. Goode stated that he had treated a bunch of calves by placing them in a closed building and burning alcohol and sulphur, remaining in the building as long as possible, then opening the doors. This was repeated several times with curative effect.]

A TUBERCULAR CASE.*

By L. U. SHIPLEY, V. S., Sheldon, Iowa.

On July 15, 1904, I was requested to examine a Shorthorn cow, property of a stockman of Inwood, Iowa. The history as given by the owner was that this cow had been apparently in the best of health and had given birth to a fine calf in April and had given a plentiful flow of milk, much more than the calf could take care of, but for about a month previous to my visit had not acted as lively as usual, although her appetite and digestion were perfect. She showed lack of coördination of the posterior extremities, especially when assuming a standing position after being down. After moving off a few steps, to all appearance the movements were normal. Pulse and temperature were normal. Auscultation and percussion revealed nothing abnormal. Without making any definite diagnosis, prescribed a tonic. On Oct. 3, 1904, or 78 days after my first visit, was again called to see this cow. Found her down, unable to rise, the owner stating that she had been in this condition for about one week. When in a natural position upon the sternum she ate and drank heartily, but if she got down upon her side she evinced much distress and moaned until helped back upon the sternum. Found temperature and pulse normal, and as before

* Presented to the Meeting of the Iowa State V. M. A., Jan. 25-26, 1905.

percussion and auscultation revealed nothing abnormal, having previously expressed the belief of some tubercular lesion. It was the owner's intention to have the tuberculin test applied, but not being prepared to do so and the apparent indications of a fatal termination caused me to advise destruction and a post-mortem, which was consented to. The village butcher was sent for, who did the killing and removed the hide, and who volunteered the information that the carcass was a perfectly healthy one; in fact, in was a fatter looking beef than one often sees upon the average country butcher block.

The above information and appearance caused the owner to regret destruction, remarking that he would bet we could not find anything. After removing the digestive organs found them in a normal condition excepting a few slight tubercular nodules in the liver; kidneys and genital organs normal; then proceeded to the thoracic organs; found lungs and heart normal, excepting a few milliary tubercles in the superior border of the right lung, but found several large tubercular nodules in the anterior mediastinum and thymus glands, from the size of a hen's egg to as large as a base ball, but irregular and nodulated. After removing the contents of the thorax, observed a soft swelling protruding from between the articulating ends of the right fifth and sixth ribs. Upon incision a large quantity of creamy pus escaped. Further inspection showed this abscess extended between the transverse processes and articular facets through the posterior notch of the fifth vertebra into the spinal foramen. The character of this irregular fistulous tract and its contents showed its existence for a considerable length of time and that it was without doubt the original tubercular lesion. The history and symptoms of this case also proved this lesion had existed for at least three months, and no doubt the pressure of the pus upon the spinal cord when lying upon the side caused the distress, which was relieved when in an upright position and the pressure was downward or away from the cord.

AMPUTATION OF THE PENIS.*

By C. E. STEWART, Chariton, Iowa.

About one year ago I was called to see a ten-year-old Hambletonian gelding affected with phymosis, and the penis greatly swollen and painful to the touch, but animal was in good health in other ways.

* Presented to the Meeting of the Iowa State V. M. A., Jan. 25-26, 1905.

The ordinary treatment was used to reduce the swelling, which slowly disappeared, but the animal was never able to retract his penis. However, he was used a little on a dray, but was too obscene to be driven only after night.

About three months ago the organ was again injured, supposed to be due to another horse stepping on it, as it bore the mark of a toe-calk, and as the animal was not of much value he was turned out in a pasture to struggle for himself and the penis swelled to enormous size and was very painful, followed by a gangrenous condition, with considerable sloughing and such rapid emaciation of the animal that it was seen he would survive only a few days, and the animal was brought to me for treatment. I advised the owner that the only thing to do was to amputate the organ, which he readily consented to, saying he had gotten tired of seeing it and he said he had thought for a long time that he was troubled with an over-production of penis.

Operation.—The animal was cast and tied as we would for castrating a ridgling, the penis was withdrawn as far as possible and the parts thoroughly washed with a solution of creolin, 1 to 100.

A catheter was then passed and a stitch taken in the distal end of the penis and tied to the catheter to prevent it from coming out during the operation. An incision was then made with the scalpel through the skin and about three-fourths of the circumference of the penis and about four inches above the end of the prepuce, then other incisions were made in a transverse manner until the dorsal artery was severed, which was then twisted with hæmostatic forceps. The urethra was then dissected out and severed about an inch and a half from the stump, and the mass that was removed weighed five pounds.

By severing the urethra about an inch and a half from the stump makes the stump very similar to the natural apex of the penis, aside from the fact that the meatus urinarius does not project into the natural deep fossa at the apex of the penis.

The animal did not resist the operation very much, and when released got up and went to eating. After-treatment consisted of flushing the sheath once a day for a few days with a solution of creolin, 1 to 150, and allowing the animal to run at pasture.

Animal did not lose more than three gills of blood, and but little swelling followed, and he gained in flesh every day after the operation until he was well, which was but a short time.

By this way of operating there is the least possible surface to heal, and I am inclined to the opinion that we are prone to consider this a far more difficult and dangerous operation than we should.

A PELVIC HERNIA WITH POSTERIOR DISPLACEMENT OF THE CÆCUM.*

By L. U. SHIPLEY, V. S., Sheldon, Iowa.

Was called to attend a small gray mare with the following history and symptoms: Had been bred to a heavy draft stallion, two or three days previous and immediately turned out to pasture. The day following she was found lying down with symptoms of abdominal pains. She was taken up and placed in the barn and as her condition did not improve I was called. Found her lying down on her side. When made to arise would immediately lie down again, but did not seem to suffer acute pain. Pulse 72, strong and vibrating, temperature normal; auscultation of abdomen denoted the usual borborigmi. Then resorted to rectal and vaginal exploration. After passing the hand through the vulva, felt a tense body superiorly, which I thought was the rectum filled with fæcal matter, but when the hand was inserted into the rectum was surprised to find it empty, this tense body inferior to it. Then with one hand per rectum and the other per vagina made a careful manipulation. From the tense rebounding character of the body concluded that I had an abscess to deal with, so procured a trocar and canula and carefully inserting per rectum punctured the body, and instead of pus or serum, the contents of the cæcum flowed out through the canula. This gave immediate relief and the mare resumed standing position and began eating, and further exploration that I was able to make led me to believe that the cæcum had returned into the abdominal cavity. Had the animal placed in a narrow stall, elevating the posterior extremities as much as possible with instructions to keep her in this position for some days, but two days later was called again and found her in the same condition as upon the first arrival. Repeating the puncturing operation seemed to give temporary relief as before, but the condition soon recurred and as the animal was of little value was allowed to die with no further attention, not even giving me an opportunity for P. M. My theory is that the broad ligament must have been lacerated by coition.

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* Presented to the Meeting of the Iowa State V. M. A., Jan. 25-26, 1905.

A RADICAL OPERATION FOR STRANGULATED SCROTAL HERNIA.*

By L. U. SHIPLEY, V. S., Sheldon, Iowa.

In August of 1903, during my temporary absence, Dr. H. Shipley was called to treat an Irish hunter stallion which had been driven in from the country about five miles and upon arrival showed colicky pains. Was given the ordinary colic treatment, which appeared to give some relief for a short time. Upon my arrival home visited the case and found him in considerable pain, but exhibiting no other symptoms other than those ordinarily observed in a case of spasmodic colic, but after some reflection suspected inguinal or scrotal hernia and examination verified my suspicion. Found that the intestine was not only in the inguinal canal, but the right scrotal sac was considerably distended with intestine. I advised the owner of the condition and that a radical operation was necessary and that immediately. The owner remarked that I would have to castrate to operate successfully and that he would as soon have the horse die as have him castrated. As "necessity is the father of invention," after some reflection I informed the owner that I thought that I could operate successfully without castrating, or at least try, as the case would surely terminate fatally without an operation, so consent was given. After procuring Dr. Henry Shipley to assist, the horse was cast and properly secured upon the back, with the hind limbs drawn well back and spread in a similar manner as for cryptorchid castration. Rectal taxis was first tried without success. We then proceeded with an operation as follows: The scrotal and inguinal regions were disinfected with a creolin solution. The testicle was grasped, tensing the cord, and with the small hook blade of a Zigler castrating knife, an incision was made near the inguinal ring downward and parallel with the spermatic cord about five inches long through the skin and peritoneal tunic, being careful to avoid injury to the intestines. The hand being well disinfected was passed into the incision and the intestines carefully pressed back through the inguinal ring. The wound was then cleansed with a creolin solution and packed with absorbent cotton and two or three stitches applied in the skin to retain the packing in position. The horse was then released and assumed a standing position and seemed to be relieved of pain. He was placed in a box-stall and given a stimulant. The next morning the temperature was 104 and some pain present. Drank

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water freely, but refused food. Was given febrifuge and tonic treatment. On the second day temperature was 102 and the bowels moved for the first time. The fæces were coated with mucus. He ate green grass with some relish. On the morning of the first day the stitches were removed and part of the cotton taken out, leaving a small portion up next the inguinal ring. The latter was removed on the second day. The wound was left open and treated as a simple wound. Treatment consisted of washing with creolin solution and dressing with dusting powder; there was some suppuration for a few days, but the wound healed rapidly. The case made good recovery. There was never any extensive swelling of the testicle. It was carried drawn up a little higher than its mate for a time, but soon was carried in a normal position. This horse has been in stud service throughout the season of 1904.

CHRONIC CRURAL PARALYSIS FOLLOWING AZOTURIA.*

By JOHN THOMPSON, Iowa.

It has been my lot every year for the past eight or nine years to meet with a few of the above cases, and while they are without doubt familiar to nearly every practitioner, it has never been my good fortune to learn as to experience and views of others in the matter.

With various methods of treatment I have employed so far, all cases treated, with three receiving no treatment, have terminated alike—an apparent spontaneous recovery at the end of from seven to ten months following time of attack, and in no case has my interference seemed able to shorten the period.

When the time for recovery has arrived the muscle structure apparently develops fully, or nearly so, within about six weeks. The improvement, though of course gradual, is rapid and recovery complete.

Among the agents I have used are such irritants as tinct. iodine, strong soda chloride solution, turpentine, etc., injected intramuscularly, or rather in and around muscle sheath, over affected parts, at intervals of a couple of weeks. Slight tumefaction would follow such injections, but within a few days the region would resume its characteristic hollow appearance, with limb as useless as ever. Deep puncture firing, using thermocautery, along course of atrophied muscles, repeated every month, has given the same results.

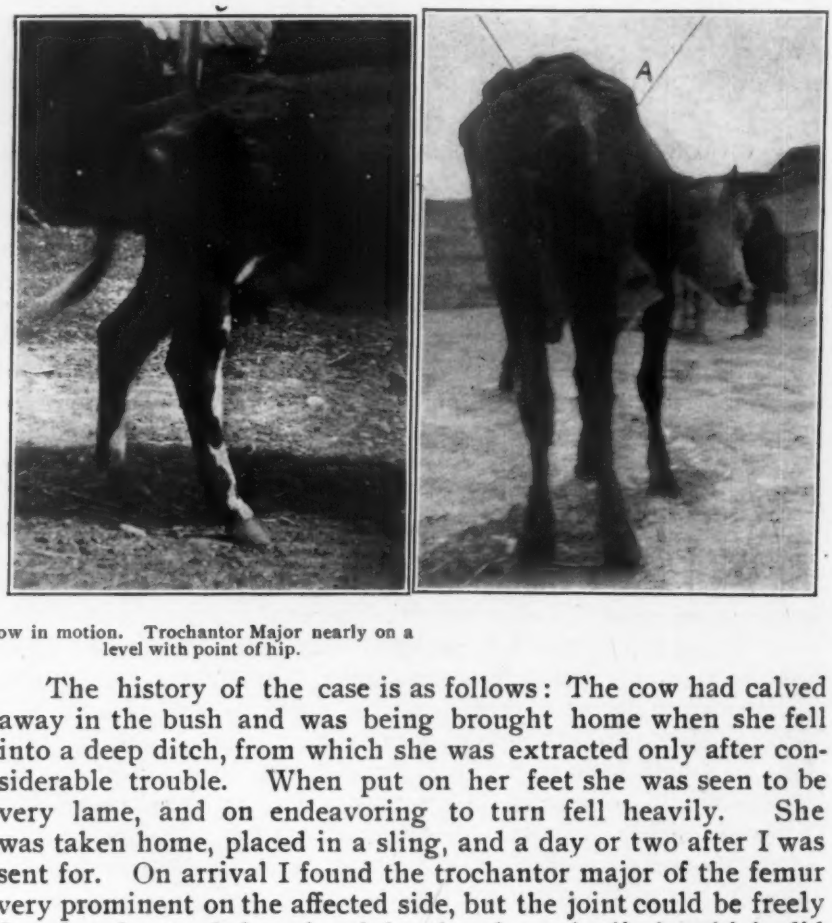
* Read before the Iowa State V. M. A., Jan. 25-26, 1905.

LUXATIO SUPRA COTYLOIDEA.

By E. M. WESTON, G. M. V. C., Launceston, Tasmania.

The accompanying photos may prove of interest to you, as they illustrate a somewhat unusual condition, *i. e.*, luxation of the femur. The cow was very restless and got a bit out of focus, which renders one of the photos a trifle misty, while I also happened to snap the camera just when her tail was curling over her back. The second photo shows her in motion, when the upward displacement of the trochantor major is most marked.

T. M. in normal position. Trochantor Major displaced upwards.



Cow in motion. Trochantor Major nearly on a level with point of hip.

The history of the case is as follows: The cow had calved away in the bush and was being brought home when she fell into a deep ditch, from which she was extracted only after considerable trouble. When put on her feet she was seen to be very lame, and on endeavoring to turn fell heavily. She was taken home, placed in a sling, and a day or two after I was sent for. On arrival I found the trochantor major of the femur very prominent on the affected side, but the joint could be freely flexed and extended, and weight placed on the limb, which did

not appear to be shortened. My diagnosis was strain and rupture of the deep adductors and stretching of ligaments of the articulation, but I did not think the head of the femur had left the acetabular cavity. I applied a good stiff pitch plaster over the region of the joint, the cow remained in the slings eating, and milking well for about two months. When let out slight shortening of the leg, with upward displacement of the head of the femur was evident. The forward stride was shortened, and the leg swung outwards as in human patients recovering from a paralytic stroke. I have in my employ an old partially paralyzed sailor, and the resemblance between his gait and that of the cow was so conspicuous as to immediately attract the attention of the children on the farm. For some time after being let out of the slings the cow required a lift when getting up, but now she gets up and down herself, and hobbles about without much trouble. In anatomical language the luxation would be classified as "Luxatio Supra Cotyloidea."

A CURIOUS CASE OF BROKEN BACK.

By E. A. Weston, G. M. V. C., Launceston, Tasmania.

The subject was an old grey trotting mare, who had staked her hoof. Upon examining it I decided to throw and chloroform her before operating. Accordingly she was taken onto a level patch of grass and thrown with the neck-collar and sidelines. I had plenty of strength, and she went down easily without trouble, coming first onto her haunches, and then rolling over onto her side. She groaned, however, as though in pain, but took the chloroform well and lay quietly during the operation. Upon coming round she proved unable to either sit up or stand, and I was reluctantly compelled to tell her owner that I feared she had broken her back. He could not credit my statement, as he had been present during the throwing; so to satisfy him I rigged a triangle, and sent away for the slings. When we slung her she was quite unable to use the hind-quarters, and subsequently she was let down and shot. Post-mortem revealed melanosis (which I had previously noticed round the anus) of the sublumbar prepectoral, bronchial, and small glands lying under the longissimus dorsi; extensive rupture of the diaphragm, probably due to lying in the slings with the bowels full of grass and fracture of the tenth dorsal vertebra. The spine of this bone was intact, but the body and pillars were shattered into fifteen separate pieces, which I have vainly endeavored to put together. Unfortunately it was boiled previous to examination,

but there is no doubt that the cancellated tissue was affected with melanosis, only the outside shell being left. When the spine was bent in throwing, the bone was crushed between the two adjoining vertebræ like an egg between two boards. This is proved by the weight, the broken bone weighing 2 ounces 5 drachms, and a healthy adjoining vertebra 4 ounces. The cancellated tissue which remains is softened, and open in structure, having evidently been the seat of a rarefying ostitis. Melanotic growths are usually classified as sarcomata, but a sarcoma is stated by pathologists to have no lymphatics, and to be spread by the bloodvessels. Now in this case the secondary infection seemed to be confined to the lymphatic glands, which would probably be infected from the lymphatic vessels, so that the growth approximated more nearly to the carcinomata in that respect.

A CASE OF TETANUS AS A SEQUEL TO PARTURITION.*

By L. U. SHIPLEY, V. S., Sheldon, Iowa.

On April 30, 1904, was called to attend a mare that had foaled about one week or ten days previous. Found a well-marked case of tetanus with tonic spasms of all the muscles, but this mare was able to masticate and continued so throughout the course of the disease, but when she laid down had to be helped up. As the disease was so well marked did not consider there would be any benefit derived from antitetanic serum, so advised isolation and good care. The colt was left with her and suckled and apparently obtained sufficient nourishment. The case made a good recovery and the foal remained healthy. The two interesting features of this case were, first, the probable source of infection per the genital tract, and, second, the non-transmissibility of the disease to the foal.

DR. JOSEPH HUGHES, Chicago, Ill., spent the last week of April in Nashville, Tenn., attending the race meeting at Cumberland Park and visiting professional friends in that section of the South.

DR. JOHN B. HOPPER, of Ridgewood, N. J., is a man who puts his scientific knowledge to serve practical ends. He is the proprietor of the Ridgewood Veterinary Forge, where horseshoeing, pathological or otherwise, is scientifically done.

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* Presented to the Meeting of the Iowa State V. M. A., Jan. 25-26, 1905.

ARMY VETERINARY DEPARTMENT.

EPIZOÖTIC LYMPHANGITIS.

There has just been published a "Treatise on Epizoötic Lymphangitis," by Captain W. A. Pallin, F. R. C. V. S., of the Veterinary Department, British Army,* which comes in good time and renders the first comprehensive account of this recently recognized disease. While primarily intended for the veterinary officers of the English Army and Civil Department, it is none the less interesting, instructive and valuable for American veterinarians, particularly those of the Army. As the subject is of such importance we shall review the book more fully, invite attention to our own experiences, and make some suggestions which will enhance the international value of the book in its next edition.

In the "*literature of the disease*" the author records fully the English contributions, but only those of Nocard and Leclainche in French, and that of Tokishige, Japan. Yet, Mosselman and Liénaux in their "Manuel de Microbiologie Vétérinaire," give a very accurate description of the "cryptococcus of Rivolta," with other valuable notes, and "Joly," in "Les Maladies du Cheval de troupe," devotes a whole chapter to this disease, giving entertainingly its history, cause, symptoms, diagnosis, differential diagnosis, treatment, and the statistics of the disease in the French army since 1887. He mentions as early writers such known names as Tixier and Delamotte, Chénier, Jacoulet and Froissard, Wiart, Auiclet, Barrier and others, and altogether it is apparent that the early literature on this disease must be found in France. As to other countries there is no doubt that the Italian and Russian veterinarians have extensively written on the disease, although their accounts are only known to me from references and reports in German veterinary journals. The Germans themselves have no experience with the disease. Finally several of our American veterinarians have published articles on the disease as observed in the Philippine Islands, to which we shall allude later on. In a monograph of a disease like this the "literature" is an important part, not because it records names of authors, but because it greatly helps to comprehend its history, geographical distribution, variety of symptoms observed, experiments conducted, different methods of treatment applied, mortality recorded, etc.

* William R. Jenkins, 851 Sixth Ave., New York. Price, $1.25.

The "*nature of the disease*" is thus defined by the author: "Epizoötic lymphangitis is a virulent inoculable disease, characterized by suppuration of the superficial and subcutaneous lymphatic vessels, due to the presence of a specific organism." From our observation in the Philippines we would define it as "an infectious disease of solipeds, caused by the cryptococcus of Rivolta, characterized by the formation of specific ulcers of the skin, more rarely of the mucous membranes, and complicated in severe cases by suppurative inflammation of the superficial lymphatic vessels." There are ample reasons for this wording of the definition. The spread of the disease is ordinarily maintained by infection with grooming brushes, etc., its *primary symptom surely is the formation of ulcers*, lymphangitis rarely develops if the case is promptly taken under treatment, and suppuration of lymphatic vessels takes place only in exceptionally severe cases. At least this was our experience in the Philippines. It is also proper that the specific organism should be named irrespective of whether future researches will confirm it to be saccharomyces or cryptococcus.

The "*history and geographical distribution*" of the disease are most interesting and well compiled, and give a vivid picture of the struggles in observation and investigation during two decades which were needed to have the disease finally recognized as specific. Of this the author says: "The disease has from time immemorial been invariably confounded with glanders-farcy and ulcerative lymphangitis, in whatever part of the world it has appeared, and even with the assistance of mallein and modern science, veterinarians of nearly every nationality still continue to make the same mistakes." There is little doubt that this is true, but the reasons for confounding the true farcy and this pseudo-farcy, as the disease has been formerly called, are near at hand and amply explained by its newness and scanty literature. As far as American veterinarians in the Philippines were concerned they were quick to recognize the specific nature of the disease, and myself and a few others have only blundered as regards the correct name, which is by no means a happy choice. The author seems to believe that when glanders-farcy and epizoötic lymphangitis are co-existing, the danger of confounding the two diseases is great (page 25), but our experience in the Philippines leads us to think that this very co-existence of the two diseases saved us from error and greatly helped us to differentiate the two.

A most interesting retrospect is opened up before us if we scan the short history of epizoötic lymphangitis and then let it

glide into the remote history of glanders. Both the author of the treatise and our French army colleague Joly, come to the conclusion that the prolonged and heated differences of opinion about the malign or benign nature of glanders-farcy of the early French veterinary authors can now be explained by the presence of epizoötic lymphangitis in France as early as 1800 and before. To the student of the history of glanders, outside of France, these fierce combats of our historic French confrères were always fascinating, but unexplainable. The older German veterinarians, for instance, who only knew the true farcy, never ceased to wonder how their French colleagues could have invented such terms as "benign farcy, curable farcy, river-farcy," etc. We can now see that these few offtimes were not and could not have been ripe for a finer differential diagnosis, and it needed not only the advent of the microscope but the advanced knowledge of bacteriology of our last decade to finally distinguish these two diseases one from the other.

Most of us will be surprised to learn that the disease extends over many widely scattered countries. It has longest been known in Algiers, France and Italy, but is now known to exist in Egypt, Turkey, Russia, Sweden, and recently imported into England and Ireland. It has long existed in Japan, also presumably long in India, Java and Bali, to which we must now add the Philippines. It is unknown in the United States, Germany, Austria. That a disease of such wide geographical distribution is threatening to those countries that do not as yet harbor it is evident, and we shall be lucky if we can keep this annoying newcomer from our shores.

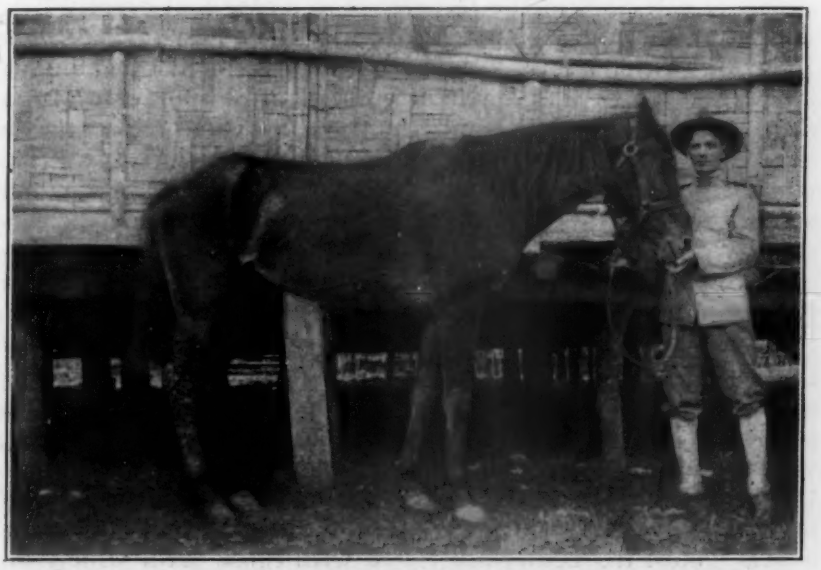
The "*bacteriology*" of the disease, including the different methods of staining and the developing of cultures, constitutes a highly instructive chapter, brought together with diligence and apparent practical acquaintance with the subjects treated. These chapters must be studied, and while perhaps our army colleagues at present stationed in the Philippines have had more time and better opportunities to study the cryptococcus of Rivolta than we had during the war-time, yet I feel certain that the information given in the treatise will be a welcome guide to them.

The "*incubative period*" of the disease is given by the author as "varying from three weeks to three months, and even to six, eight or ten months or more." These observations made from experimental inoculations of the author are new to us, as we have not noticed any reference to this important point in the publications of our own army veterinarians. The author records

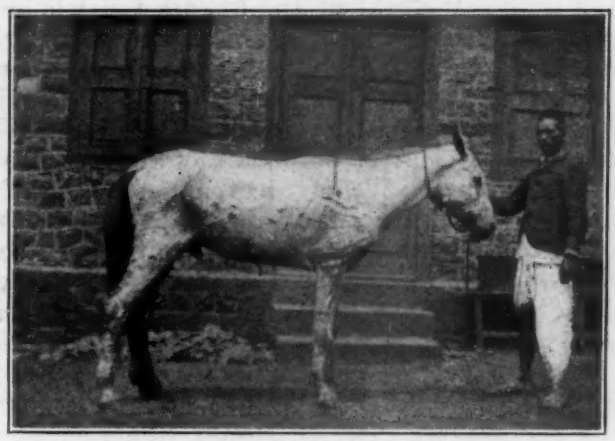
PLATE I.

Pseudo-farcy, Vigan P. I. 1901. (O. Schw.)

PLATE II.



1. Dr. Gelston's Case. Philippines. 1901.



2. One of Major B. Mills' Cases. India. 1901.

also a case in which the disease recurred after being apparently cured. I can confirm the recurrence in a case that greatly tried the patience of Dr. Gelston, 3d Cavalry, (see photograph, Plate II, No. 1) which finally came under my treatment by change of horses and which was apparently cured after months of treatment. But in about one month ulcers appeared anew and the horse was destroyed, having been rendered unserviceable. The whole right hind-leg was dotted with cicatrices between which new ulcers appeared and the entire skin of the leg had become indurated, resembling a case of elephantiasis.

The "*symptoms*" of the disease are very fully described in a chapter of twelve pages. The author divides the symptoms into the "cutaneous variety" which more resemble farcy, and into the "mucous-membrane variety" which more resemble glanders. This classification of symptoms is quite practical for purposes of differential diagnosis. In describing the "cutaneous variety" the author goes over the regions of the head, neck, trunk, fore and hind limbs, giving the favored and more common parts of affection, calling attention to the fact that the disease is "most frequently associated with those parts which are most exposed to wounds from kicks, contusions, and harness-galls.

The careful description of the "pustules or nodules," from which later on form the "ulcers or sores, which very much resemble farcy-buds," agrees in the main with that given by our own army veterinarians. That "the disease is commonest in the limbs," is surely our observation also. But when the author says: "If a limb is the seat of the disease the whole leg may suddenly swell up like an ordinary case of lymphangitis, and *cording and knotting* of the *adjacent lymphatic vessels* may also *usually* be felt so clearly that even from the beginning they may be *frequently seen from a distance*," we wonder if he has not had to deal with severer outbreaks of the disease than we had in the Philippines. We have had such cases, but they were not as ordinary as the author seems to wish to impress upon us, and although the treatise contains thirteen photographs of the typical ulcers, just as we have seen them, he fails to give a picture of a case with cording and knotting of the lymphatic vessels, "*which radiate toward the nearest lymphatic gland.*" We take the liberty to reproduce one such case of Major Mills, Bombay, India (*Veterinary Journal*, London, January, 1904), on the shoulder of a horse (see Plate II, No. 2), where we have never seen it in the Philippines.

In describing the "*mucous membrane variety*" of the symptoms, the author states "that it has been noticed by him in some seven to ten per cent. of cases," which is unusually large according to our observation. He found the lesions on the conjunctiva, on the membranes lining the alæ of the nostrils, septum nasi, sinuses of the head, pharynx, larynx and upper third of trachea, and he bears out his claim by two exceedingly interesting photographs of sections of the skull of horses. We have only observed ulcers in the lower nostrils from autoinfection of animals nosing their affected legs. There was no time for us to make searching post-mortem examination, but it seems as if there is a general scarcity of post-mortem records of this disease. This is evidenced in the chapter on "*Post-mortem lesions*," which only covers one and one-half pages, and yet it is only by a thorough study of the pathological anatomy of the disease that the various dark points, which the author himself points out throughout the treatise, can be explained and accurate knowledge be obtained

In the "*differential diagnosis*," the author enumerates as diseases likely to be confounded with epizoötic lymphangitis: (1) glanders-farcy, (2) *ulcerative* lymphangitis (Nocard), (3) *simple* lymphangitis and its sequelæ, *i. e.*, *suppurative* lymphangitis, (4) *tubercular* lymphangitis, (5) bursatti, (6) botryomycosis, and (7) a number of other diseases ordinarily named in the differential diagnosis of glanders in text-books. There can be no doubt that the similarity of this disease with the several other diseases mentioned above can be close. But it seems rather unfortunate that we must sharply distinguish between such like names as epizoötic, ulcerative, suppurative and tubercular lymphangitis, and we fear that the danger of confounding these diseases lies not so much in the diseases themselves as in the similarity of their names. Perhaps the author has felt this himself when he particularly mentions that Marcone was anxious to change the name of epizoötic lymphangitis to "Saccharomycosis farciminosis (Rivolta)." This latter term may not be a phonetic improvement over the former, but it will certainly be more appropriate if investigators can only agree on the question whether the cryptococcus of Rivolta is a saccharomyces. The author of the treatise has already adopted this nomenclature in presenting the pictures of the vegetable parasite. Moreover, as far as the clinical symptoms of the disease ordinarily have shown themselves to us, it is hardly an epizoötic and seldom a lymphangitis, but an infection carried around in ordinary ways, resulting in

the formation of *specific ulcers* as the common symptom. It is only in neglected cases and in those aggravated cases which have a tendency to run beyond control under treatment, that we see the development of lymphangitis, of cording and knotting of lymphatic vessels, etc. I think it would be wise, from the reasons indicated, to officially adopt the term "Saccharomycosis farciminosis," retaining as synonyms: epizoötic lymphangitis, African farcy, pseudo-farcy, the names under which the disease became first known.

This would leave us free to distinguish more easily the "*ulcerative* lymphangitis of Nocard," which, according to our author, "is due to a *bacillus* discovered by Nocard in 1899. It is an ordinary saprophyte, easily stained by Gram's method. As far as the author could gather from the literature on the subject, it is a disease that has only been recognized in France." But even in France this disease cannot be much known, because Joly* does not mention it anywhere. This disease also "*resembles very much farcy, but there is an absence of the induration of the lymphatic glands, and the ulcers and sores easily yield to treatment.*" I regret that the author makes here the mistake to conclude that the "tropical ulcers" described by me (AMERICAN VETERINARY REVIEW, May, 1902,) may be nothing but "bursatti or a vesicular eruption as seen amongst horses running at grass during the rainy season in India." Of course, we know bursatti in America, and as our horses were daily under saddle chasing insurrectos, they had no time to run at grass. I admit that my description is not as readable as I could write it to-day in my comfortable study, and my failure to recognize the cryptococcus of Rivolta is explained by the conditions under which I was working; a field-microscope, badly battered by transport in wagon or on a pack-mule, and an upturned cracker-box serving as a table. However, I gave a good photograph (see Plate I) and even if this first account of the disease from the Philippines was inadequate, there have been since other articles published by our army veterinarians. Dr. Nockolds, 1st Cavalry, contributed two descriptions of the disease (A. V. REVIEW, November, 1902, and May, 1903), and Dr. Jewell, 13th Cavalry, one article in the A. V. REVIEW, (April, 1904), with two good photographs of an affected Filipino pony, and a second article in the "Proceedings of the A. V. M. Association, 1904.) Both veterinarians describe the symptoms of the disease, varying only inconsiderably, and while they used the terms

* Joly, Les maladies du cheval de troupe.

"ulcerative lymphangitis" (Nockolds) and "Contagious ulcerative lymphangitis" (Jewell), and while Dr. Jewell even suggests that the disease would be more properly termed "*Contagious ulcerative dermatitis*," yet there is unfortunately no doubt that the disease present in the Philippines is the epizoötic lymphangitis as described by the author. These vaccilations in naming the disease and describing its symptoms, lead one to think that there may be differences in the character of the disease at different times and in different localities. The author of the treatise himself generously admits that during his stay "*in China in 1900 he observed cases of so-called glanders, but there was no submaxillary glandular enlargement, no reaction of mallein, and no glanders lesions could be detected in the lungs or other internal organs on post-mortem examination, and that for want of a better name he considered that they were a form of pseudo-glanders. Whatever the disease was, it caused many differences of opinion, especially amongst the German veterinary officers. Mallein was blamed for so-called unsatisfactory results, but few seem to have considered the possibility of two diseases being present and co-existing in many cases.*" Thus it is clear that we do not as yet stand on firm ground as regards the best name and the true characteristics of the disease, but time, continued study and publications of veterinarians from different countries affected will ultimately straighten out all these discrepancies.

In the chapter on "*Experimental inoculation and susceptible species*," the author states that according to "Tokishige's experiments the disease may also affect cattle, but that he is inclined to think that this requires further corroboration." Nocard and the author reproduced the disease by inoculation in horses, mules, and donkeys, but failed in cattle, goats, and guinea-pigs. Dr. Jewell, 13th Cavalry, states that the disease does not affect cattle in the Philippines, and my own experience is that we used many hundreds of native trotting oxen for light transportation, which mingled with affected horses, but I never observed infection of cattle during two years. The author further mentions that a man inoculated himself with the disease in Bangalore, India, in 1899, numerous bubos forming along the course of the lymphatics, right up to the armpit, but that after suffering severely for several weeks a cure was effected.

Under "*Immunity*" Tokishige is quoted as stating that the popular idea among farmers in Japan is that one attack reduces the predisposition of the animal to the disease, but that this

appears as questionable. Other writers on the subject have seldom omitted to point out the likelihood of the disease recurring.

The chapter on "*Treatment*," which is divided by the author into external and internal treatment, enumerates different drugs applied and the results obtained, and recommends "the complete extirpation of the tissues invaded, followed by the actual cautery and antiseptic dressing." Our own treatment, particularly during the earlier Philippine campaign, consisted only of the use of Creolin (Pearson) with dressings, which is all we had, and the results obtained were generally satisfactory if the disease could be taken under treatment at once. There were several obstinaceous cases that tried one's patience, and I particularly remember two cases that ran beyond control, in spite of treatment and the condition of the horses became such that they had to be destroyed. As internal treatment the author recommends "administering compounds of iodine and mercury, both of which seem to have more or less specific effect on the disease, particularly mercury."

The treatise finishes in considering the "*Prophylaxis*," in which are given fifteen rules for preventing the spread of the disease. These rules are thoughtfully brought together and are evidently the result of an extended practical acquaintance with the disease.

Altogether the treatise on "Epizoötic lymphangitis" is a very valuable contribution to our knowledge of this disease, and Captain Pallin should be thanked for its laborious preparation and publication. OLOF SCHWARZKOPF.

VETERINARY HISTORY.—Dr. A. S. Alexander, replying to an inquiry by a correspondent of the *Breeder's Gazette* of May 24, as to the "Origin of Veterinary Science," dates its inception back to the writings of Homer and Xenophon, but says the true founder was Vegetius, who wrote "De Arte Veterinaria," 300 A. D. Coming down to more modern data, he credits the first veterinary school to France, where the Lyons School was established under royal patronage in 1761, quickly followed by Alfort in 1766. Then the Veterinary College of London, Eng., was opened in 1791. Bringing the history to America, he asserts that the first school to open its doors in this country was the Ontario Veterinary College (Toronto) in 1863. Dr. Alexander in this last statement has failed to observe that the New York College of Veterinary Surgeons had been in operation six years when Prof. Smith started his school.

EXTRACTS FROM EXCHANGES.

GERMAN REVIEW.

By ADOLPH EICHHORN, D. V. S., Bureau of Animal Industry, Great Bend, Kansas.

SALIVATION IN A HORSE—CURE WITH PILOCARPIN.—The horse salivated to such a degree that the saliva flowed in great quantities from the mouth; the appetite remained good; in general condition, however, the animal has somewhat fallen off. Parotid hard and swollen. The duration of this condition about three months. After numerous and unsuccessful treatments, the author injected the horse with pilocarpin hydrochlorate, to irritate the gland; at first 0.3 gm., which was followed by a diminishing in the flow of saliva. On the following day, 0.4 gm., and on the next day 0.5 gm. were injected. Further diminishing of salivation was noticeable. This treatment was followed by the application of iodine and iodide of potassium ointment to the gland. Recovery took place.—(*Wochenschr. f. Thierheilk.*)

TWO CASES OF UTERINE RUPTURES IN COWS [*J. Kukuljevic*].—*Case I.*—A five-year-old cow manifested great labor pains, at the same time gradually the abdomen became greatly enlarged. After two days, the cow was found lying on the left side, without any labor pains. In palpating the greatly distended abdomen on the right side the fœtus and its movements were felt. The right half of the perineal region was greatly distended. The outside of the thigh, and anteriorly to this the parts of the abdomen, were considerably swollen, and inside of this swelling the fœtus was palpable with its head in the region of the stifle; also the edges of the rupture of the abdominal muscles were felt. Efforts to bring the fœtus into the birth passage were fruitless. The cow was slaughtered, and at the same time Cæsarean section was performed, so that the calf was saved and brought up. On the right abdominal wall a rupture of about 60 cm. was present, also a rupture of the right horn of the uterus was found. *Case II.*—Clinically this was just the same as the previously described case. As here also the efforts to bring the calf into the right passage remained unsuccessful, the cow was slaughtered, and the calf saved by performing Cæsarean section at the right time. The author believes

that the uterine ruptures during the act of parturition were caused by the extraordinary size of the calves, as traumatic interference could positively be excluded. — (*Allatorvosi Capok.*)

A CASE OF CARCINOMA OF THE CÆCUM IN A DOG [*Prof. de Meis and Prof. Parascandolo*].—A bull dog refuses all nourishment, becomes noticeably emaciated and vomits bile constantly and violently, writhes from pain, and passes fæces only every 3 or 4 days. Collapse, general debility, complete cessation of defecation and urination. Meteorism of the abdomen, especially so on the sides. The cause of the constipation is established through laparotomy. After isolating and removing the head of the cæcum, a large portion of this was found to be covered with a tough new formation, which was removed by resecting the head of the cæcum. The distal end of the cæcum and the end of the small intestines were united with the aid of a Murphy button, the peritoneum and the wound closed with sutures. Antiseptically bandaged. The tumor qualified itself as a carcinoma annulare. The pulse increased in two hours from 78 to 120; temperature after 6 hours 36°C. The patient complains and passes a small quantity of urine, receives caffein, camphor, tinct. valerian, æther. The temperature rises in two days to 39°; pulse unchanged, high. Endovenous injections of artificial serum was given. Cessation of vomiting; milk and egg is retained by the stomach. After four days the pulse is thready and hardly perceptible; respiration is accelerated. On the fifth day *exitus letalis.* At the autopsy no sign of bleeding can be noticed. The serous covering of the intestines at the place where brought together was found completely united. No signs of peritonitis. As the cause of death the authors suspect an autointoxication. — (*Arch. f. Wissen. u. prakt. Thierh.*)

CONTRIBUTION TO THE KNOWLEDGE OF THE HISTOLOGICAL CHANGES OF THE PANCREAS, IN PANCREATIC DIABETES [*A. Halasz*].—Although the connection between the affections of the pancreas and diabetes mellitus was brought to attention by Cowley as early as 1788, and also mentions were made of this possibility by Bright, Lloyd, Fredrichs and Lanceraux, the teaching of pancreatic diabetes, however, had not won a sound basis until Mehring and Munkowski succeeded in producing a severe pronounced diabetes through extirpation of the pancreas in dogs. However, positive pathological conditions were not recorded, as on one side the pancreas failed to reveal lesions in

men succumbed from severe diabetes, or were only present to a very slight extent, and on the other, severe affections of the pancreas were found without the accompaniment of diabetes. The pathology of pancreatic diabetes was not based on positive grounds until the attention was directed to the conditions of the islands of Langerhan in diabetes. Said islands are present in every pancreas and are representing 0.07.-0.03 mm. large, round masses of cells of irregular formations. They remain intact in case of ligation of the pancreatic duct, and also in diseased conditions of the pancreas; however, in cases of diabetes mellitus, will show an affection by themselves or in a preponderating degree. Ebner was the first who attributed carbohydrate changes to these islands of Langerhan; their diseased condition in diabetes mellitus was first proved by Scobelen, then Opic, Weichselbaum, Stangel, etc. Weichselbaum and Stangel differentiated three forms of affections, namely, the simple atrophy, the vacuol formations, and the hydropic degeneration, also the new formation of the connective tissue. The author examined histologically the pancreas in 15 cases of diabetes mellitus, and found in every case the changes in the islands of Langerhan. The changes were not the same in every case; they showed sometimes simple atrophy, while in other cases sclerosis, still in others they transformed in a homogenous colloidal mass, sometimes again showed a change in the walls of the vessels or of the epithelial cells. The atrophied islands are in most cases elongated, the cells contain little plasma and are irregular; their nucleus takes stain intensely; the islands are sometimes surrounded by a capsule of strong connective tissue. In other cases a swelling, and in every case a colloidal degeneration of the epithelial cells was noticeable. In several cases, the vessels of the islands proved a hyaline degeneration. In the majority of cases, the changes of the islands caused a primary diseased condition of the vessels, through which the connection of arterial sclerosis in diabetes mellitus can be explained.—(*Orvosi hetilap.*)

ARSENIC-CANTHARIDES OINTMENT FOR THE REMOVAL OF SKIN WARTS [*Pecus*].—The author recommends the following formula: ℞ Arsenici albi, pulveris cantharidum, āā 1.0; olei terebinthinae venalis, 2.0; olei lini, cerae flavae, āā 5.0. M. ft. unguentum. Sig. Externally. The warts to be rubbed twice with this ointment at intervals of several days. The ointment is of a somewhat hard consistence, and should be warmed on the fire before use.—(*Schweitz. Arch. f. Thierh.*)

FRENCH REVIEW.

By Prof. A. LIAUTARD, M. D., V. M.

OSSEOUS AND CARTILAGINOUS MELANOSIS [*Proj. J. Nicolas*].—This affection has not been frequently observed. With the exception of Bru, Spooner, Lenat, Fröhner, Cadeac, and Cunningham, who related cases of it, the literature is poor. The following case adds to the history: At an abattoir the carcass of a white horse was seized because of generalized melanosis and the following were observed: it existed principally in the bony marrow and the bony tissue itself. There were melanotic infiltrations and tumors. The pericardium was slightly affected. The myocardium and vascular trunks were not. All the lymphatic glands were diseased, although not extensively. The lungs had a few blackish spots, the pleura also. There were deposits in the trachea; the liver contained many, the spleen very few. If the general mass of the organism showed only slight lesions, it was not so with the skeleton. In the head, the maxillaries presented in the spongy structure melanotic deposits; they were small. There were some also in the occipital and the temporal. In the trunk all the bones were more or less affected. The vertebræ, cervical, dorsal, lumbar, and even caudal, presented in their spongy structure marks of melanosis, very extensive in the cervical, somewhat less in the dorsal and gradually diminishing in the others. The sternum was extensively affected. The ribs more or less. It was noticed that for the bones of the trunk, those of the anterior part were less affected than the posterior. In the extremities also all the bones were extensively diseased. In the scapula the spongy tissue was black, the periosteum slightly diseased, the cartilages of prolongation free from it. The humerus, radius and cubitus, the coxæ, the femur, the patella, the tibias were also more or less affected, not only in the spongy tissue, but on the periosteum and on the articular cartilages. In the digital regions no trace of pigment was found; from the carpus and tarsus down every one was normal.—(*Journ. de Zoötechnie, Jan., 1905.*)

TORSION OF THE UTERUS—ABNORMAL RETENTION OF FŒTUSES IN A SLUT [*Mr. Bonnet*].—This slut was seven years old. For three days she had been dull, refusing her food. Some two week previous she acted as if she was going to have pups,

although she was not suspected to be pregnant. The genital organs examined revealed nothing; the os uteri was well contracted and the vaginal walls felt perfectly normal. However, in examining the abdomen, her condition was readily made out; several fœtuses were felt in the uterus. Surgical interference was decided upon and the Cæsarean operation adopted as the one indicated. The animal well prepared with all precautions of anæsthesia, asepsy and antisepsy, the abdomen was opened. A large quantity of rosy, semi-purulent fluid escaped. It was useless to continue the operation; the animal was killed. At the post-mortem five dead fœtuses, in an advanced state of putrefaction were found; one floating among the intestinal mass and surrounded by its placenta, one engaged in a laceration of the right horn; the others were still attached to the walls of the uterus in the left horn. The uterus was entirely twisted, the right horn having turned round the left, which acted as an axis while the other was going round it. The borders of the uterine wound were thickened and purple in color. The bladder had also been displaced, was largely distended and filled with fluid having a strong odor of fermentation. All the other organs were sound.—(*Journ. de Zoötechnie, Jan., 1905.*)

TUBERCULOUS PERICARDITIS IN A DOG [*Prof. G. Leblanc*]. A large sized Danish slut has lately acted sick, and gets large. She still eats well. She shows evidence of ascites, the abdomen contains an enormous quantity of liquid. She has no cough and has no indications of having been exposed to tuberculosis. However, this is suspected. On percussion of the chest, when the animal is lying, dullness is perceived in the cardiac region. When she is standing, there is also dullness, but on both sides and not horizontal, as in case of pleurisy or hydrothorax. On auscultation the respiratory murmur is not heard on either side, except near the vertebral groove and a little on the middle and superior part on the right. The beatings of the heart are entirely unheard on either side. Pulse is accelerated and strong. An intra-pericardiac collection is suspected. After a few days of treatment, the animal is destroyed. Post-mortem: about 10 litres of serosity are taken from the abdomen; the liver is enlarged, a true cardiac liver; kidneys congested. In the chest a large quantity of fluid in the pleural cavity, no inflammation of the pleura; lungs pushed upwards; pericardium forms an enormous sac, filling the three quarters of the thoracic cavity; the serous coat is thick and fibrous, and contains two litres of serosity. In opening the pericardial sac, the dilated heart is ex-

posed and numerous tuberculiform growths are found on the surface of the pericardium and in the structure of the heart. The endocardium and the valves are sound. No tuberculosis in the lungs; lymphatic glands are healthy.—(*Journ. de Zoötechnie, Feb., 1905.*)

PARALYSIS OF THE LOWER JAW IN A DOG—SLOW RECOVERY [*J. Nicolas*].—This affection is considered in dogs as one of the most characteristic of dumb rabies; however, it is not pathognomonic of this disease. It has indeed been observed with other affections and numerous are cases on record, such as those of Möller, Galtier, Waltrup, Caussé, Youatt, and many others. Whatever may be the causes, which are sometimes difficult to demonstrate, there are cases of recovery of the paralysis which seem to exclude the idea of its being essentially a symptom of rabies. The following is another. For four days this dog is dull, has lost his appetite, has paralysis of the lower jaw, saliva escapes from the mouth. "Evidently," says the owner, who has had other dogs affected with rabies, "this dog has the same trouble." Besides this, the dog walks staggeringly. During three days that he is under observation, he does not become aggressive, not even excited; he remains always laying down and refuses all food. On the fourth day, it was expected that he would be found dead; he is not, but is next to it, as he is so thin and has lost so much flesh that he has the aspect of a dog in the advanced stage of paralytic rabies. But it is observed that when the dogkeeper is to take hold of him, the dog wags his tail. Is he suffering with rabies? is the question. An examination of the mouth, which was not made at first, is carried out without result. The next day the dog begins to eat; meat placed in his mouth is swallowed. He digs his whole nose in the pail containing his food and succeeds in taking most of his meal. From this day, he becomes more gay, more coaxing; by degrees the general symptoms subside; locomotion becomes firmer; in a week he is returned to his master in good health. He had received no treatment whatsoever.—(*Journ. de Zoötechnie, Feb., 1905.*)

UMBILICAL HERNIA IN A FILLY—RADICAL OPERATION—RECOVERY [*Prof. Coquot*].—This filly is thoroughbred and two-and-half years old. Born with the hernia, this has grown gradually and is now as big as the fist. She has been submitted to several treatments. Not liking nitric acid applications, the use of the clamp was resorted to, but failed, as two months after the tumor was as large as before. The use of the forceps of Benaud

was not any more successful. Finally, as the hernia was enlarging, as the animal was becoming subject to repeated attacks of colics, from failure of the alimentary masses to pass, and finally as there was danger of strangulation, it was decided to resort to the operation for radical recovery, viz., the surgical closing of the umbilical ring with sutures. After preparation, the animal was secured and the parts thoroughly aseptized. An incision of the skin made on the median line exposed the hernial sac. The hernial tract was found cylindrical, six centimetres long and with the walls indurated. The edges of the ring were excised slightly and scraped with the bistoury and brought together with four strong sutures of silk. The flaps of skin were trimmed and sutured with Florence hair. Salol dressing was put on and kept with adhesive plaster. The whole was covered with a pad of pasteboard held in place by a bandage. There were no serious complications.—(*Rec. de Med. Vet., March 15, 1905.*)

A Surprise of Post-mortem [*H. Benjamin*].—Calling at a stable to visit a lame animal, the author had his attention called to a ten-year-old horse which has been ailing for a week. There is nothing particular, except that he refuses his oats, eating only hay and mashes. For better opportunity to examine him, he is sent to the hospital of Mr. B., where it is proposed to purge him; but as he eats that day some six litres of oats, the purgation is not given. During the night the horse is heard kicking in his stall and when looked at he is found suffering with paralysis of the right hind-leg. His urine is clear and normal in appearance. The next day he is put in slings, but hangs down in them; he is let down and dies during the night. At the post-mortem lesions of very acute peritonitis are found, and (here is the surprise): "The left kidney is the seat and the centre of an enormous tumor, extending to the right beyond the median line, and which is filled with white grumulous pus. Both kidneys were enlarged. On section, their parenchyma is purplish and wine colored." It is regrettable that rectal examination had not been made, as it might have given some indication of the condition, which during life had never been manifested by the animal.—(*Bullet. de la Soc. Cent., March, 1905.*)

Strangles—Abscess of the Superior Molar Gland Extending to the Meninges [*M. M. Augustin*].—Aged four years, this mare is ailing. She is dull, is rather feverish. The next day she is found with an enormous swelling of the entire

left side of the head. It has invaded all the region of the masseter, spreading to the parotid, and the eyelids are kept closed. The whole region is warm, painful, hard; mastication is difficult; no appetite; abundant diarrhœa. Temperature 40° C. The diagnosis of purpura is set aside, and a deep abscess is suspected. Treatment is prescribed accordingly. No improvement is shown. Slight deep fluctuation is detected and puncture made with the thermo-cautery, but without result. General weakness becomes more and more marked. The animal can scarcely stand up. Another puncture is made and bloody reddish pus with the typical aspect of salivary pus, escapes in small quantity. The condition continues to get worse; the weakness is more marked; diarrhœa continues; hepatized spots are discovered on auscultation of the lungs. Death occurred on the fourth day. Post-mortem: The masseter, removed by slices, covers a small abscess, which in the deep layer communicates with a larger accumulation in the molar gland. The pus macerated the surrounding tissues of the masseter muscles, the alveolo-labialis and the pterygoideus. Not collected into one pouch, it runs backwards, deeply inwards, round the temporo-maxillary joint, which is the seat of inflammation. A larger collection of pus exists in the spterygoideus muscles, which extends upwards under the sphenoid, and finally enters the cranial cavity through the occipito-spheno-temporal hiatus. The meninges are gorged with blood, inflamed, thickened. In the abdominal cavity there were lesions of enteritis and in the thorax those of diffused pulmonary gangrene.—(*Rev. Gener. de Med. Vet., March, 1905.*)

THE chairman of the Army Legislation Committee of the American Veterinary Medical Association, Dr. William Herbert Lowe, of New Jersey, attended a conference in Philadelphia on May 13 relative to proposed army legislation.

PLAGUE IN CATS.—W. Hunter's conclusions as to the occurrence of plague in cats, are as follows: 1. Cats suffer from plague. 2. The disease may be acute or chronic. 3. The type of the disease is septicæmic. 4. These animals may occasionally play a part in the dissemination of plague. 5. In plague infected districts possible plague infection in cats is of great importance from a domestic point of view. 6. In plague infected areas cats probably become infected through plague rats and mice which they devour as food.—(*London Lancet, April 22.*)

CORRESPONDENCE.

VETERINARY INTERESTS IN CUBA—SOME NATIVE CHARACTERISTICS.

SANTIAGO DE LAS VEGAS, CUBA, May 3, 1905.

Editors American Veterinary Review :

DEAR SIRS:—Possibly some notes from a "tenderfoot" in this tropical country may be of interest to American veterinarians.

In the investigation of animal diseases very little original work has been done in the Latin American countries, and there is very little modern veterinary literature in the Spanish language.

One of the first difficulties to be overcome in the study of animal diseases here is to recognize the well-known diseases from the common Spanish names. I have found a number of familiar diseases and some that are new to me.

As would be expected, parasitic diseases are common and quite serious. Cattle are troubled a great deal with ticks (*B. Australis*), and other varieties are found on other domestic animals. A remedy used here for ticks and one of the most efficient I have ever tried is a drug called *Cebadilla*, evidently the ground seeds and leaves of one or more species of *Schœno caulon*, which is imported from Mexico. One pound of *Cebadilla* is put in five gallons of strong alcohol (*Aguardiente*) and allowed to stand a few days. It is applied by hand dressing with a rag. It is also a much more efficient insecticide than the emulsions that are commonly used. As alcohol can be purchased for twelve cents per gallon it is not a very expensive remedy. Calves and sometimes older cattle suffer seriously in some localities from lung worms (*S. micrurus*) and also from liver flukes (*F. hepatica*). Scabies is occasionally seen in horses, but I have not seen it in cattle. Black-leg is common in calves, and outbreaks of anthrax also occur in cattle. Bovine tuberculosis is rare, although human tuberculosis is common. Tetanus is very frequent, and wounds must be carefully treated to guard against this infection and to prevent invasion of "screw flies."

There are very few qualified veterinarians in Cuba, and most of them are graduates of Spanish or French veterinary schools. In the country districts most of the veterinary work is performed by farmers and blacksmiths, and as most of them

can neither read nor write their work is very crude. Actual cautery in a severe form is common. Bulls are castrated by twisting the scrotum over a forked stick and striking the "cord" several times with another stick until it is severed, no incision being made in the skin. Many ridiculous superstitious forms are also practiced for curing diseases in animals. The writer prescribed for a case of acute indigestion, only to learn later that the horse was cured by getting a small twin girl to make the sign of the cross over it—a remedy that is believed to be infallible. N. S. MAYO.

TO REGULATE THE PUBLIC SERVICE OF STALLIONS IN WISCONSIN.

MADISON, WIS., May 9, 1905.

Editors American Veterinary Review:

DEAR SIRS:—Please find enclosed copy of our new stallion service act, which should prove of great interest to veterinarians as well as horse-breeders.

The bill was drafted by me and is the first step in a propaganda we have started for the advancement of horse-breeding in Wisconsin.

Note the clause relative to soundness of stallions. We could not compel the owners to employ a veterinarian to make examination of stallions—or could not get such a provision through the legislature, but the clause as it stands will practically make it certain that veterinarians will be called in to examine the stallions, for I conclude that an owner will be afraid to make affidavit as to soundness of his horse without having a veterinarian's opinion on the matter.

Sincerely yours, A. S. ALEXANDER, M. D. C.,
Prof. Vet. Science and Horse breeding, Wis. Agrl. College, Prof. Vet. Hygiene, Breeding, etc., C. V. C.

* * *

Senate Bill No. 216, approved April 22, 1905.

A BILL TO REGULATE THE PUBLIC SERVICE OF STALLIONS IN WISCONSIN.

The people of the State of Wisconsin, represented in Senate and Assembly, do enact as follows:

SECTION 1. Every person, firm or company standing or traveling any stallion for profit or gain in this state shall cause the name, description, and pedigree of such stallion to be enroled by the department of horse breeding of the college of

agriculture, university of Wisconsin, and procure a certificate of such enrolment, from said department, which shall thereupon be presented to and recorded by the register of deeds of the county in which said stallion is used for public service.

SECTION 2. In order to obtain the license certificate herein provided for, the owner of each stallion shall make oath before a notary public that such stallion is, to the best of his knowledge, free from hereditary, contagious or transmissible unsoundness or disease, or, in lieu thereof, may file a certificate of soundness signed by a duly qualified veterinarian, who shall be a regular graduate of a recognized veterinary college, and shall forward this affidavit, or veterinarian's certificate, together with the stud book certificate of registry of the pedigree of the said stallion and other necessary papers relating to his breeding and ownership to the department of horse breeding of the college of agriculture.

SECTION 3. The officers of the department or horse breeding of the said college of agriculture, whose duty it shall be to examine and pass upon the merits of each pedigree submitted, shall use as their standard for action the stud books and signatures of the duly authorized presidents and secretaries respectively of the various horse pedigree registry associations, societies or companies recognized by the department of agriculture, Washington, D. C., and shall accept as pure-bred, and entitled to a license certificate as such, each stallion for which a pedigree registry certificate is furnished bearing the signature of the president and secretary of a government-recognized and approved stud book.

* * *

SECTION 4. The owner of any stallion standing for public service in this state shall post and keep affixed, during the entire breeding season, copies of the license certificate of such stallion, issued under the provisions of the next succeeding section, in a conspicuous place both within and upon the outside of the main door leading into every stable or building where the said stallion stands for public service.

SECTION 5. The license certificate issued for a stallion whose sire and dam are of pure breeding and the pedigree of which is registered in a stud book recognized by the government department of agriculture, shall be in following form :

University of Wisconsin,
College of Agriculture,
Department of Horse Breeding.

CERTIFICATE OF PURE-BRED STALLION NO. ——.

The pedigree of the stallion (name) . . . . . .
Owned by . . . . . .
Described as follows:
(Color) . . . . . (Breed) . . . . . .
Foaled in the year ———, has been examined at the College of Agriculture, and it is hereby certified that the said stallion is of pure breeding and is registered in a stud book recognized by the Department of Agriculture, Washington, D. C.

(Signature) . . . . . .
Dean of the College of Agriculture.

The license certificate issued for a stallion whose sire or dam is not of pure breeding shall be in the following form:

University of Wisconsin,
College of Agriculture,
Department of Horse Breeding.

CERTIFICATE OF GRADE STALLION NO. ——.

The pedigree of the stallion (name) . . . . . .
Owned by . . . . . .
Described as follows:
(Color) . . . . . .
Foaled in the year ———, has been examined at the College of Agriculture, and it is found that the said stallion is not of pure breeding and is, therefore, not eligible for registration in any stud book recognized by the Department of Agriculture, Washington, D. C.

(Signature) . . . . . .
Dean of the College of Agriculture.

The license certificate issued for a stallion whose sire and dam are pure bred, but not of the same breed, shall be in the following form:

University of Wisconsin,
College of Agriculture,
Department of Horse Breeding.

CERTIFICATE OF CROSS-BRED STALLION NO.——

The pedigree of the stallion (name) . . . . . .
Owned by . . . . . .
Described as follows:
Color . . . . . .
Foaled in the year ———, has been examined at the college of agriculture, and it is found that his sire is registered in the . . . . . and his dam in the . . . . . .
Such being the case, the said stallion is not eligible for reg-

istration in any stud book recognized by the Department of Agriculture, Washington, D. C.

(Signature) . . . . . .
Dean of the College of Agriculture.

SECTION 6. Every bill, poster, or advertisement issued by the owner of any stallion enroled under this act, or used by him for advertising such stallion, shall contain a copy of its certificate of enrolment.

SECTION 7. A fee of $2.00 shall be paid to the horse breeding department of the college of agriculture, university of Wisconsin, for the examination and enrolment of each pedigree and for the issuance of a license certificate in accordance with the breeding of the stallion, as above provided.

SECTION 8. Upon a transfer of the ownership of any stallion enroled under the provisions of this act, the certificate of enrolment may be transferred to the transferee by the department of horse breeding of the college of agriculture upon submittal of satisfactory proof of such transfer and upon payment of the fee of 50 cents.

SECTION 9. Violation of any of the provisions of this act shall be punished by a fine of not exceeding fifty dollars.

SECTION 10. This act shall take effect and be in force from and after January 1, 1906.

LAUREL AS A POISON FOR DOMESTICATED ANIMALS.

The following letter from the Bureau of Plant Industry, Department of Agriculture, in reply to a private inquiry by Dr. Bell, is published, as it is deemed of importance to the profession at large:

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY,
WASHINGTON, D. C., May 9, 1905.

Dr. Roscoe R. Bell, Brooklyn, N. Y.:

DEAR SIR:—Your letter of the 4th inst., addressed to Dr. D. E. Salmon, Chief of the Bureau of Animal Industry, making inquiry relative to the poisonous properties of the laurel, has been referred to this office for attention.

In reply I beg to state that in the latter part of the eighteenth century, Peter Kalm described cases of poisoning in animals—horses, sheep, and cattle—from eating the laurel, and since then at intervals cases have been reported in the literature. It seems that these animals will eat laurel leaves, especially if they have

been deprived of green food for some time. The symptoms produced by laurel poisoning are nausea, frothing at the mouth, dullness, inability to stand, drowsiness, stupor, disinclination to move, irregularity in breathing, and even paralysis and death. In one case of poisoning of a sheep which occurred under our observation, the symptoms were marked, but it is thought that the animal was probably saved by the persistent diarrhœa, so that it would seem advisable to aid nature by the administration of saline purgatives. In 1802 Thomas published some experiments in which he mixed lard with the laurel preparation, and he found that these preparations were very much less poisonous than controls in which no lard was used. The administration of lard in cases of poisoning by laurel is still popular among the farmers.

We would certainly advise against pasturing animals in a field in which laurel is present. The subject of laurel poisoning is now under investigation in this laboratory, and it is hoped that more detailed information concerning the active principle and physiological action of this plant will be available in the near future.

Very truly yours,

ALBERT C. CRAWFORD, *Pharmacologist.*

APPRECIATION OF TIMELY HELP.

NASHVILLE, TENN., May 4, 1905.

Editors American Veterinary Review:

DEAR SIRS:—State Senator H. E. Howse, a prominent merchant-politician of Nashville, championed the cause of the veterinary profession of Tennessee at the last session of the legislature of that State by introducing and having successfully passed Senate Bill No. 38. This legislative act regulates the practice of veterinary medicine by creating a Board of Veterinary Medical Examiners, etc.

After the Senate had passed the Bill it was introduced in the Lower House by Hon. W. P. McClure and successfully passed that body. These two law-makers deserve the plaudits not only of the veterinarians of Tennessee and the South, but of the United States and America; in fact, each and every veterinarian should appreciate to the fullest extent the interest that a layman and friend takes in the development and protection of our profession.

Senator Howse and Representative McClure enjoy the unique distinction and honor of fathering the first veterinary

practice act which adorns the statute books of a Southern State. Yours very truly,

GEORGE R. WHITE.

[NOTE.—In the statement that the recent law secured in Tennessee is the first practice act passed by a Southern State, our correspondent overlooks the fact that Virginia has had such a statute law for about ten years and North Carolina for at least three years.—R. R. B.]

WANTED—SOME INFORMATION.

LAUNCESTON, TASMANIA, April 3, 1905.

Editors American Veterinary Review :

DEAR SIRS :—While writing I would like to know if any of your readers, who have had a large practical experience of metritis, septic metritis, retention of the placenta, and peritonitis following parturition in the mare, can give me any hints regarding the successful treatment of these affections. I have met with them a good deal in my practice, but cannot say that they have brought me much credit or satisfaction. Another point I would like some light on is the hypodermic dose of citrate of ergotine for the mare, and the toxic dose of liquor extractum ergotæ B. P. The doses advised in most works on therapeutics are quite useless. I am yours, etc.,

E. A. WESTON, G. M. V. C.

UNIVERSITY OF PENNSYLVANIA GETS $100,000 MORE—APPROPRIATION FOR AN EXPERIMENT FARM FOR PENNSYLVANIA.

PHILADELPHIA, May 15, 1905.

Editors American Veterinary Review :

DEAR SIRS :—I hasten to inform you that the Governor has approved the act passed by the legislature of Pennsylvania appropriating $100,000 to the Veterinary Department of the University of Pennsylvania. This, together with the gift of $100,000 received last fall, and other contributions in prospect, will enable us to establish the sort of institution that we have for many years been working and longing for.

I am sure that the veterinary profession will also be interested to know that the Governor has approved another act of assembly under which funds will be furnished for purchasing a farm and for providing equipment for the study of infectious diseases of animals. We will probably purchase a farm of 150 acres in Delaware County that we have been using for the past year and a half in connection with our investigations in rela-

tion to the vaccination of cattle against tuberculosis. Dr. Gilliland and I have 128 cattle in experiments on this subject. Ample funds are also provided for meeting the expenses incident to the management of this work.

While the Bureau of Animal Industry has a nice piece of ground in the country near Washington, for use in connection with its experimental work, and while some very good research work has been carried on at some of the agricultural experiment stations, this is the first instance in America, of which I have knowledge, in which a State has purchased and set aside a fairly well-equipped farm for use as an experiment station for the study of infectious diseases of animals.

In Germany there are a few *Seuchen Versuchsstationen*, and there are some in other countries of Europe. It is strange that the States of the United States with their vastly greater live-stock possessions have not before this made more ample provision for investigations concerning diseases of animals and for veterinary education.

The veterinary profession of Pennsylvania has, as usual, worked as a unit for the attainment of these objects and is to be congratulated on its success in this, its greatest undertaking. A very heavy responsibility has been placed on those who have to plan and execute the work thus provided for and it is a source of great satisfaction to them to know that they may depend on having the help and coöperation of the veterinarians of the State.

Very sincerely yours,

LEONARD PEARSON.

BECAUSE a horse is blind does not seem to be any reason why owners of good trotting-bred mares should not mate them with him at a high fee. There is a blind stallion now in the blue-grass district, which is getting all the stud business he can do at a fee of $100.

FOR a long time it was popularly supposed that to obtain a large yield of rich milk from the cow was only a question of feeding. That idea is now very properly discredited by all who have studied the matter, and it is generally admitted that we cannot, under normal conditions, feed fat into milk to any appreciable extent, or for any length of time. The quality of richness of milk in butter-fat depends almost entirely on the breed and individuality of the cow, and no amount of feeding will ever convert a three-per-cent. cow into a four-per-cent. one. —(*Robb.*)

COLLEGE COMMENCEMENTS.

GRAND RAPIDS VETERINARY COLLEGE.

The eighth annual commencement was held in the College Auditorium at 8 o'clock on the evening of March 30, 1905, when the following gentlemen received the degree of Doctor of Veterinary Science: Charles H. Bay, Cambridge, Ohio; Levi P. Bailey, McBride, Mich.; N. D. Baldwin, Ludington, Mich.; Amma Biddison, Viroqua, Wis.; N. L. Boilore, Alpena, Mich.; A. C. Branson, West Branch, Iowa; L. P. Conkey, Prairie Depot, Ohio; T. F. Curtin, Pittsfield, Mass.; J. A. Culbert, Grand Rapids, Mich.; R. G. Dingman, Prophetstown, Ill.; A. F. Elkin, Rossmoyne, Pa.; J. H. Elkin, Smicksburg, Pa.; E. L. Ferguson, Lyons, Mich.; Wm. H. Ferguson, Ionia, Mich.; E. H. Fletcher, Belding, Mich.; W. D. Garratt, Marietta, Ohio; P. S. Kingston, Madison, Wis.; C. C. Lane, Unadilla, Mich.; George H. Lape, Albany, N. Y.; J. M. McMichael, Dowagiac, Mich.; Kenneth A. Miller, Kynston, Victoria, Australia; V. P. Norton, Grand Rapids, Wis.; Emmitt Otto, Clarksville, Mich.; E. A. Pettit, Ionia, Mich.; Wm. E. Price, Milford, Ind.; L. B. Rinehart, Ludington, Mich.; August F. Sauer, Grand Rapids, Mich.; F. D. Seed, Wallaceburg, Ont., Canada; C. E. Steinburg, Benton Harbor, Mich.; A. B. Warrener, Portsmouth, Ohio; R. E. Wise, Royal Center, Ind.; James P. Young, Pewee, W. Va.

Dr. A. F. Elkin of Rossmoyne, Pa., received the gold medal, having passed the best general examination on all branches of the profession; Dr. Emmitt Otto, of Lansing, Mich., received the silver medal for second place, and Dr. J. H. Elkin of Smicksburg, Pa., was awarded the third prize. The special prize offered by Dr. Armstrong for the best paper on materia medica went to Dr. R. E. Wise, of Royal City, Ind.

MAN'S NOBLE FRIEND.—The barking of a Scotch terrier belonging to John McCarthy, of No. 66 South 2d St., Williamsburg, led to the discovery of a fire and was probably responsible for the saving of many of the lives of the sixteen persons asleep in the house at the time. Shortly before 5 o'clock McCarthy was awakened by the barking of the dog, which then jumped on the bed and began to paw at the bed covering. McCarthy found, when fully aroused, that the room was filled with smoke, and quickly warned the inmates of the house, who reached the street in safety.—(*N. Y. Tribune.*)

SOCIETY MEETINGS.

THE REVIEW presents its compliments to Secretaries of Veterinary Medical Associations throughout the United States and Canada, and begs to again remind them that this journal earnestly desires to publish the transactions of every meeting held within that large territory. It points with pride to this department in Volume XXVIII, which include *most* of them; but two or three have failed to avail themselves of our oft-repeated invitation to give the profession at large the benefit of their deliberations. We want a closed volume of the REVIEW to constitute a complete record of everything of interest and value in a veterinary sense occurring in all the Americas during that period.

MASSACHUSETTS VETERINARY ASSOCIATION.

The twenty-first annual meeting and banquet of this Association was held at Young's Hotel, Boston, Wednesday evening, April 26. Members present were Drs. Beckett, Burr, Blackwood, Bunker, Babson, Babbitt, Cleaves, Emerson, Frothingham, Howard, Lee, Lewis, May, Maloney, Peters, Perry, Pierce, Playdon, Peterson, Winchester, Winslow and White.

Dr. J. F. Ryder, of the Bureau of Animal Industry, was the guest of the evening.

On motion of Dr. Perry, seconded by Dr. Thayer, the minutes of the previous meeting were accepted as read.

The name of Dr. Daniel D. Lee was read, to be voted upon for membership.

On motion of Dr. Howard, seconded by Dr. Winslow, No. 5 on the order of business was deferred to the next meeting. It was a tie vote and decided by the Chair that the motion should not prevail.

On motion of Dr. Frothingham, seconded by Dr. Thayer, it was voted that the Secretary cast one ballot for the election of Dr. Lee. Dr. Daniel D. Lee was thereby elected a member.

Dr. Winchester moved that the meetings of the ensuing year be held at Young's Hotel or some central location agreeable to the Executive Committee. Seconded by Dr. Winslow. Carried.

The applications of Dr. John H. Meaney, of Athol, and Dr. Jacob G. Pfersick, of Greenfield, were received and were referred to the Executive Committee to be acted upon.

On motion of Dr. Winchester, seconded by Dr. Bunker, it was voted to appoint a committee of three to submit a list of names for officers for the ensuing year. The committee then retired and in a short time returned, submitting their report. Dr. Winchester moved that the report be accepted, seconded by Dr. Lewis. Carried.

On motion of Dr. Winchester, seconded by Dr. Babson, it was voted that the Secretary cast one ballot for the election of names submitted.

The following were the officers chosen for the year 1905-1906:

President—Daniel Emerson, M. D. V.

First Vice-President—Aug. S. Cleaves, D. V. S. (reëlected).

Second Vice-President—Calvert H. Playdon, M. D. V.

Secretary-Treasurer—Frank J. Babbitt, M. D. V. (reëlected.)

Executive Committee—Edward C. Beckett, M. D. V., Benj. D. Pierce, D. V. S. (reëlected), L. H. Howard, D. V. S., Charles Winslow, D. V. S., and Chas. H. Perry, M. D. V.

On motion of Dr. Bunker, seconded by Dr. Lewis, it was voted to adjourn the meeting, *pro tem.* Next in order was the banquet, which was enjoyed by all. After dinner President Beckett again called the meeting to order.

The report of the Secretary-Treasurer was then read.

Dr. Frothingham moved that the report be accepted as read, seconded by Dr. Perry. Carried.

Dr. Howard acted as toastmaster. Dr. Beckett was first called upon and responded in a genial manner, and at the conclusion of his remarks surrendered the chair to President-elect Dr. Emerson. Dr. Emerson was then called upon and responded in a fitting manner, thanking the members for the honor bestowed upon him.

Dr. Ryder, of the B. A. I., was next called upon and spoke in an interesting manner, also having some statistics which were food for thought.

Dr. Daniel D. Lee was next called upon as representing the B. A. I. at this port in former years and told some interesting experiences.

Dr. Frothingham was called upon as representative of the State Board of Registration and gave an interesting account of the work done by the board since its being established.

Dr. Maloney was then called upon as a representative of the New York College of Veterinary Surgeons, and responded in a fitting manner.

Dr. Aug. S. Cleaves responded as a graduate of McGill University.

Dr. Babson was next called upon as a representative of the Harvard Medical Alumni Association and State Board of Registration, the toastmaster laying stress on the fact that he is one of our best workers for the advancement of the veterinary profession. Dr. Babson responded in a fitting manner and answered many questions regarding registration.

Dr. Winchester was last called upon as a representative of the American Veterinary College, and replied in a genial manner.

Adjourned at 11 o'clock P. M.

FRANK J. BABBITT, *Secretary.*

THE Alumni Association of the Veterinary Department of the University of Pennsylvania will hold its annual banquet at Boothby's, 1235 Chestnut Street, Philadelphia, on the evening of June 14th. It will this year embrace the celebration of the Department's recent good fortune in being the recipient of a princely endowment and a generous appropriation from the State, and a number of prominent veterinarians of the country have been invited to attend and aid in the festivities of the joyous occasion.

THE TENNESSEE STATE BOARD OF VETERINARY MEDICAL EXAMINERS held their first meeting in Knoxille, May 13th, at which time they organized and adopted rules and regulations for the government of the Board. The following officers were elected: President, Dr. Geo. R. White, Nashville; Vice-President, Dr. J. W. Scheibler, Memphis; Secretary, Dr. M. Jacob, Knoxville; Treasurer, Dr. G. B. Blackman, Chattanooga. The above members hold commissions of appointment by Governor John I. Cox.

PREPARATIONS are well under way for the semi-annual meeting of the Veterinary Medical Association of New Jersey, to be held at Washington Park, N. J., July 13th and 14th. Veterinarians, sanitarians and others interested are invited to attend.

AMERICAN VETERINARY MEDICAL ASSOCIATION.

PHILADELPHIA, PA., May 27, 1905.

Editors American Veterinary Review:

The programme for the Cleveland meeting, August 18–21, thus far developed is as follows:

Papers.

Prof. Robt. Ostertag, Berlin, Germany, "Meat and Milk Inspection under Federal and State Control."

Prof. K. Tsuno, Tokio, Japan, (Subject not given).

Dr. J. Desmond, Chief Inspector, Central Board of Health, Adelaide, So. Australia, (Subject not given).

Dr. M. H. Reynolds, St. Anthony Park, Minn., "Stable Ventilation."

Dr. R. P. Lyman and Dr. C. H. Colton, Hartford, Conn., "Callous Fibromas."

Dr. W. L. Williams, Ithaca, N. Y., "Spavin Group of Lamenesses."

Dr. R. C. Moore, Kansas City, Mo., "Neurectomies of the Pelvic Limb."

Dr. L. A. Merillat, Chicago, Ill., "Accidents and Sequelæ of Surgical Operations."

Dr. L. Frothingham, Boston, Mass., "Negri Bodies and the Diagnosis of Rabies."

Dr. R. H. Harrison, St. Paul, Minn., "Unusual Lesions of Tuberculosis found in Abattoir Inspection."

Dr. J. W. Adams, Philadelphia, Pa., (Subject not given).

Dr. L. A. Klein, Clemson College, S. C., (Subject not given).

Dr. W. A. Stuhr, Ames, Iowa, (Subject not given).

Dr. George B. Jones, Sidell, Ill., "Hydrothorax."

Dr. A. Youngberg, Lake Park, Minn., "Swamp Fever of the Horse."

Clinicians:—Dr. S. Brenton, Detroit, Mich.; Dr. M. H. McKillip, Chicago, Ill.; Dr. L. A. Merillat, Chicago, Ill.; Dr. W. L. Williams, Ithaca, N. Y.

Still more papers and clinicians are needed and it is hoped that these will be forthcoming in the near future. Chairman Stewart of the Committee on Programme, would like a paper upon the hospital management of dogs. Will not one of our specialists on canine diseases furnish such a paper?

I would like again to call attention to the fact that applications for membership must be on file in this office by July 16 in

order to secure consideration at the Cleveland meeting. This is in accordance with a new provision made in revising the by-laws at St. Louis.

All indications are that nothing will be lacking to make our next meeting a grand success. The meeting place is conveniently located and is readily accessible, is delightfully situated on the shore of Lake Erie and the local committee has taken especial pains to provide something unusual in the way of a clinic and entertainment. This is the day of great activity in association work on the part of all professions. The interest of the members of a profession in association work is a measure of the earnestness and enthusiasm of the profession. Thus far the veterinary profession has not lagged behind but has been constantly forging to the front.

It is taken for granted that the members of the veterinary profession of America have determined that this year shall be an exception to the rule only in that the Cleveland meeting shall excel in new members secured, number and quality of papers presented, clinical demonstrations, attendance, enthusiasm and good fellowship all of its predecessors.

Yours respectfully, JOHN J. REPP, *Secretary.*

BILL TO PERMIT THE CASTRATION OF IMBECILES.—The legislature of the State of Pennsylvania passed a bill on March 21st, by 105 ayes to 28 noes, providing that it shall be compulsory for institutions in the State, interested exclusively or especially with the care of idiots and imbecile children, to appoint upon their staffs at least one skilled neurologist and one skilled surgeon of recognized ability, whose duty it shall be, in conjunction with the chief physician of the institution, to examine the mental and physical condition of the inmates. If in their judgment deemed advisable, it shall be lawful for the surgeon to perform such operation as shall be decided safest and most effective to prevent procreation. The operation shall not be performed except in cases that have been pronounced non-improvable after one year's residence in the institution.

DR. L. A. MERILLAT, of Chicago, Ill., made a professional visit, lasting a week, during the early part of May, in attendance upon a client's horses, at the Elm Ridge race track, Kansas City.

DR. JACOB FOELKER, of Allentown, Pa., accompanied by his daughter, visited friends in Kansas City the middle of May.

AS THE REVIEW goes to press we learn of the death of Dr. George H. Bailey, State Veterinarian of Maine.

NEWS AND ITEMS.

DR. J. DESMOND, Government Veterinarian, South Australia, will contribute a paper to the Cleveland meeting of the A. V. M. A., subject not yet announced.

DR. R. H. MCMULLEN, of Buffalo, N. Y., who has been in the Insular Service of the Government in the Philippines for the past two years, has returned to the United States, having been forced to resign his position on the Manila Board of Health in consequence of ill health. The Doctor spent a few hours with the REVIEW on his way home.

DR. A. JOLY, of Waterville, Maine, who worked so incessantly and to such good purpose to secure the law regulating veterinary practice in his State, has been appointed a member of the Board of Examiners to carry out the provisions of that act. The Waterville *Sentinel* of May 3 contains an excellent portrait of the doctor, and pays a neat tribute to his standing and worth.

DR. RICHARD W. A. ENGLISH, of Jersey City, has been appointed a member of the State Board of Veterinary Medical Examiners. Dr. English succeeds Dr. T. E. Smith, whose term of office expired May 5. The Governor has also appointed Dr. Thomas B. Rogers, of Woodbury, on the same Board, who succeeds himself. Both appointments are dated May 5, 1905, and are for a term of three years.

DR. VERANUS A. MOORE, professor of comparative pathology and bacteriology at the New York State Veterinary College, will sail from Philadelphia, June 3, via the American Line, for Europe, where he will visit the veterinary colleges and laboratories of comparative pathology. He states in a note that he is "anxious to see them and to learn if possible what they have that we have not in order that we may bring our standard as high as possible." He also expects to spend some time with von Behring and learn what there is in his bovo-vaccine.

THE VETERINARIAN SHOULD BE THE ANIMAL HUSBANDMAN.—Animal husbandry is, perhaps, the most popular subject at the agricultural colleges to-day, and in the form of live-stock judging classes is being called for by farmers' institutes and agricultural societies all over the country. Few veterinarians are as yet to be found in this line of work, and yet, if properly trained, the veterinarian should be the ideal animal husbandman. The holding of a veterinary certificate by no means qualifies a man to act as a judge of live stock, not even of horses,

although many a V. S. has been pitchforked into the work of rating horses and awarding ribbons by virtue of his professional status. The Veterinary Department of the Iowa State College of Agriculture has recognized this defect in the training of veterinarians, and the four-year course there now includes studies in live-stock judging, feeding and breeding. That such work has not been part of the veterinary curriculum in the colleges long ago is strange, when we consider that the bulk of the men graduated go into country practice, where a knowledge of live stock in health would be a great aid to the handling of live stock when diseased, and a strong drawing-card with the owners of live stock. It is not a rare thing at gatherings of live-stock breeders to hear a man speak disparagingly of the veterinarian's lack of knowledge of live stock, due to his (the veterinarian's) narrow training, which has hitherto assumed that his sole work was diagnosing disease and dosing the affected. On the other hand, the extreme brevity of the veterinary course at many colleges causes one to marvel that many other subjects vital to a veterinarian's education have not been omitted. In a country community where, perhaps, more than one practitioner is at work, it will be found that, professional skill equal, the man with an up-to-date knowledge of live stock, and a few herd and studbooks on his library shelves, has an advantage over his competitor who is deficient along these particular lines. In Canada at the present time it is not possible to get a really first-class up-to-date veterinary education (unless, perhaps, at the French college—Laval), and under such circumstances, we would strongly urge all persons intending to enter the veterinary profession to take an agricultural college course (two years, if one cannot afford the four-year one, but preferably the course leading to the B. S. A., and at that, specializing in bacteriology and biology) at Guelph, Truro, or Winnipeg, before attending the professional school. The V. S., by his training, knows the animal frame, by reason of his work in dissection, and has a pretty fair knowledge of the workings of the internal economy of the animal, but he has not yet been taught to apply his knowledge of location of muscles to the form of the animal as affecting motion or food production ; this the study of animal husbandry will do for him. At the agricultural colleges the future veterinarian will get the rudiments of animal husbandry, bacteriology and milk-testing, without which he cannot nowadays be considered a properly qualified, up-to-date veterinarian.—(*Farmers' Advocate, Winnepeg, Manitoba.*)

VETERINARY MEDICAL ASSOCIATION MEETINGS.

In the accompanying table will be found the dates, places of meeting, and Secretaries' names and addresses of all the Veterinary Medical Associations of the United States and Canada. Secretaries are requested to see that their organizations are properly included in the list.

Name of Organization.	Date of Next Meeting.	Place of Meeting	Name and Address Secretary.
American V. M. Ass'n.....	August 15-18.	Cleveland, O.	J. J. Repp, Phila., Pa.
Vet. Med. Ass'n of N. J.....	July 13 14,1905	Wash'gton Pk	W. H. Lowe, Paterson.
Connecticut V. M. Ass'n.....	1st Tues. Aug.	Bridgeport.	B. K. Dow, Willimantic.
New York S. V. M. Soc'y....	September,1905	Ithaca.	W. H. Kelly, Albany, N.Y.
Schuylkill Valley V. M. A....	June 21, 1905.	Reading, Pa.	W. G. Huyett, Wernersville.
Passaic Co. V. M. Ass'n.....	May 1, 1905.	Paterson, N.J.	H. K. Berry, Paterson, N. J.
Texas V. M. Ass'n.....	....	.....	A. E. Flowers, Dallas.
Massachusetts Vet. Ass'n.....	Monthly.	Boston.	F. J. Babbitt, Lynn, Mass.
Maine Vet. Med. Ass'n.....	July 12, 1905.	Augusta.	C. L. Blakely, Augusta.
Central Canada V. Ass'n.....	.....	Ottawa.	A. E. James, Ottawa.
Michigan State V. M. Ass'n...	.....	.....	Judson Black, Richmond.
Alumni Ass'n N. Y.-A. V. C..	April, 1906.	141 W. 54th St	W. C. Miller, N Y. City.
Illinois State V. M. Ass'n.....	Feb. 15, 1905.	Decatur.	W. H. Welch, Lexington, Ill
Wisconsin Soc. Vet. Grad.....	Call of Pres't.	Racine.	S. Beattie, Madison.
Illinois V. M. and Surg. A....	Call of Com.	Champaign.	J. M. Reed, Mattoon.
Vet. Ass'n of Manitoba	July, 1905.	Not determ'ed	F. Torrance, Winnipeg.
North Carolina V. M. Ass'n...	.....	.....	T. B. Carroll, Wilmington.
Ontario Vet. Ass'n.....	July, 1905.	London, Ont.	C. H. Sweetapple, Toronto.
V. M. Ass'n New York Co....	1st Wed. ea. mo.	141 W. 54th St	D. J. Mangan, N. Y. City.
Ohio State V. M. Ass'n.....	.....	Columbus.	W. H. Gribble, Wash'n C.H.
Western Penn. V. M. Ass'n...	1st Wed. ea mo.	Pittsburgh.	F. Weitzell, Allegheny.
Missouri Vet. Med. Ass'n.....	August, 1905	Kansas City.	F. F. Brown, Kansas City.
Genesee Valley V. M. Ass'n...	July, 1905.	Roch'ter, N.Y	J. H. Taylor, Henrietta, N.Y.
Iowa State V. M. Ass'n.....	January, 1906.	Ames.	H. C. Simpson, Denison, Ia.
Minnesota State V. M. Ass'n..	July, 1905.	Minneapolis	J. G. Annand, Minneapolis.
Pennsylvania State V. M. A...	.....	....	C. J. Marshall, Phila.
Keystone V. M. Ass'n.....	2d Tuesday of each month.	Philadelphia.	C. J. Marshall, 2004 Pine St., Phila
Colorado State V. M. Ass'n...	1st Mon. in June	Denver.	M. J. Woodliffe, Denver.
Missouri Valley V. Ass'n	June 26-27	Omaha, Neb.	B. F. Kaupp, Kansas City.
Rhode Island V. M. Ass'n....	.....	.....	T.E.Robinson, Westerly, R.I
North Dakota V. M. Ass'n....	January, 1906.	Fargo.	E. J. Davidson, Grand Forks
California State V. M. Ass'n...	Mch. Je. Sep, Dc	San Francisco	P. H. Browning, San Jose.
Southern Auxiliary of California State V. M. Ass'n....	Jan. Apl. Jy, Oct.	Los Angeles.	H.D. Fenimore, Los Angeles
South Dakota V. M. A.....	....	.....	E. L. Moore. Brookings.
Nebraska V. M. Ass'n.....	.....	.....	A. T. Peters, Lincoln.
Kansas State V. M. Ass'n....	.....	Topeka.	Hugh S. Maxwell, Salina.
Ass'n Médécale Veternaire Francaise "Laval,".....	1st & 3d Thur. of each month.	Lect. R'm Laval Un'y Mon.	J. P. A. Houde, Montreal.
Alumni Association A. V. Col..	April each yr.	New York.	F. R. Hanson, N. Y. City.
Province of Quebec V. M. A...	.....	Mon. & Que.	Gustave Boyer, Rigand, P.Q.
Kentucky V. M. Ass'n.....	May 30, 1905.	Louisville.	D. A. Piatt, Lexington.
Wolverine State V. M. Ass'n..	.....	.....	W. W. Thorburn.
Washington State Col. V. M. A.	1st & 2d Friday	Pullman, Wa.	Wm. D. Mason, Pullman.
Ohio Valley V. M. Ass'n.....	.....	Evansville, I'd	J.W.Moses, Mt. Vernon, Ind.
Iowa-Nebraska V. M. Ass'n..	.....	.....	A. T. Peters, Lincoln, Neb.
Louisiana State V. M. Ass'n..	.....	.....	E. P. Flower, Baton Rouge.
Essex Co. (N. J) V. M. Ass'n	May 1, 1905.	Newark.	B. K. Baldwin, Newark.

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